

MATHEMATICS FOR PRIMARY FOUR FIRST TERM





UNIT

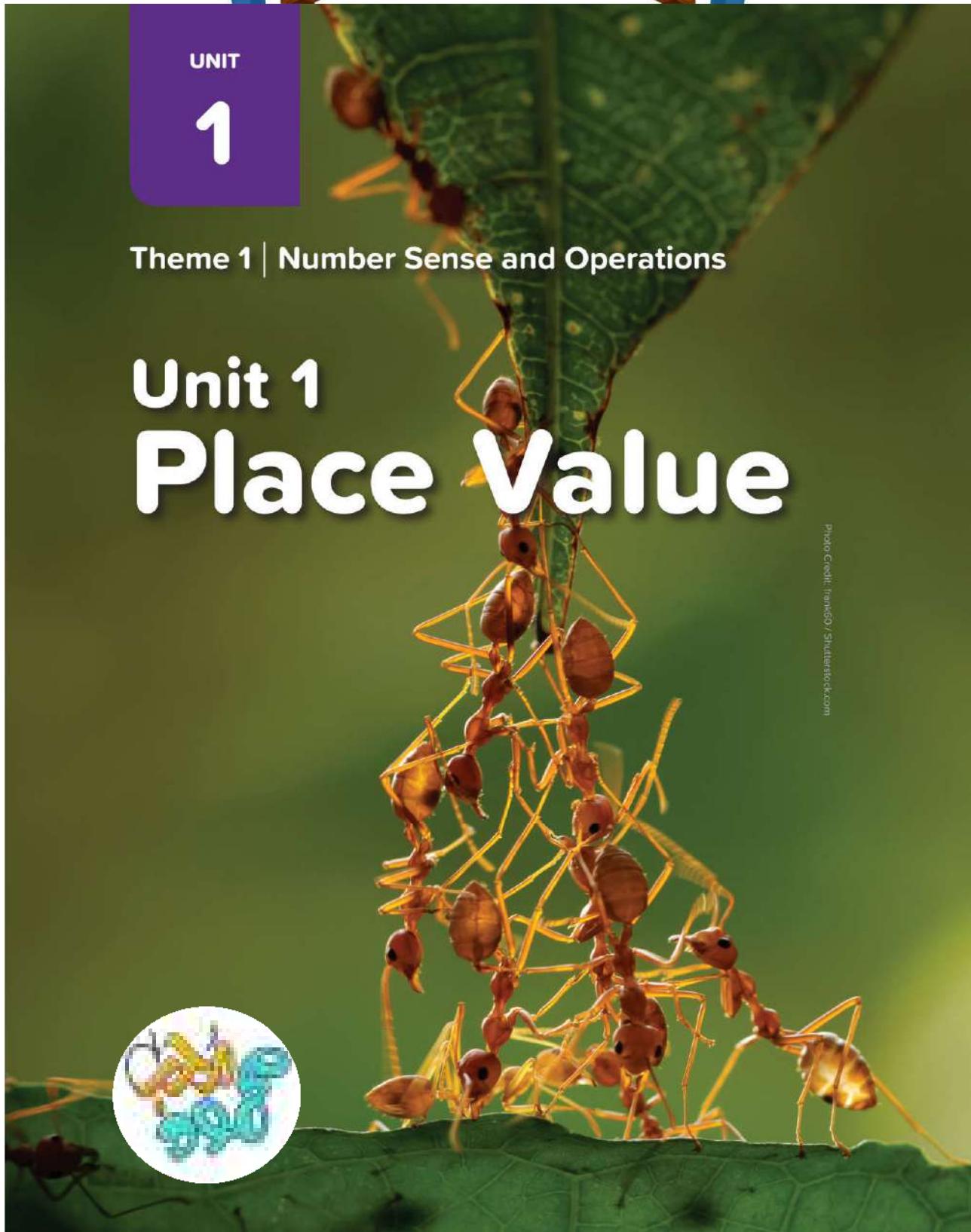
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Theme 1 | Number Sense and Operations

Unit 1

Place Value

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Concept (1): Reinforcing Place Value

Digit

it is a **single symbol** used to make numerals. Digits are **limited**, starting from the digit **0** and ending with the digit **9** (Ten digits: 0, 1, 2, 3, 4, 5, 6, 7, 8 or 9).

Number

It is an **amount** related to the numeral and consists of one or more digits. The numbers are unlimited and **endless**.

Numerical

It is a **symbol** or **name** that stands for a **number**. Examples: 3, 49 and twelve are all numerals.



PRACTICE

Write each number in the appropriate column. Some may go in more than one column.

983

thirty-seven

six

0

9

seventy-five

2,300,540

one hundred

Digit	Number	Numerical
0	0	983
9	9	thirty-seven
	983	six
	2,300,540	0
		9
		seventy-five
		2,300,540
		one hundred



Put (✓) in the suitable place:

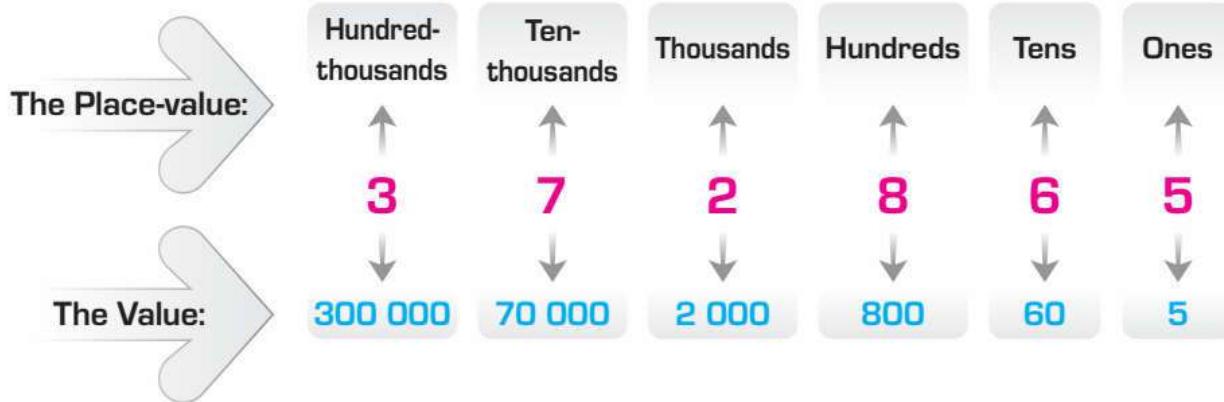
		Digit	Number	Numeral
1	2			
2	31			
3	236			
4	Twenty			
5	0			
6	11			
7	Forty-six			
8	236 917			
9	Nine			
10	2			



The Place Value

- In the following number: 372 865

Thousands			Ones		
Hundreds	Tens	Ones	Hundreds	Tens	Ones
3	7	2	8	6	5



Find the value of the underlined digit.

2. 703,8903. 63,5404. 182,0345. 345,890

Find the value of the underlined digit.

8. 230,0019. 803,04010. 46,84211. 980,650

17. **THINK SMARTER** For numbers 17a–17e, select True or False for each statement.

17a. The value of 7 in 375,081 is 7,000.	<input type="radio"/> True	<input type="radio"/> False
17b. The value of 6 in 269,480 is 600,000.	<input type="radio"/> True	<input type="radio"/> False
17c. The value of 5 in 427,593 is 500.	<input type="radio"/> True	<input type="radio"/> False
17d. The value of 1 in 375,081 is 10.	<input type="radio"/> True	<input type="radio"/> False
17e. The value of 4 in 943,268 is 40,000.	<input type="radio"/> True	<input type="radio"/> False



Composed and decomposed numbers:

Composed 345,532

Decomposed $(3 \times 100,000) + (4 \times 10,000) + (5 \times 1,000) +$
 $(5 \times 100) + (3 \times 10) + (2 \times 1)$

Milliards				Millions				Thousands			Ones		
O	H	T	O	H	T	O	H	T	O				
				3	4	5	5	3	2				

1. Composed 6,124,030,420

Decomposed _____

Milliards	Millions				Thousands			Ones		
O	H	T	O	H	T	O	H	T	O	



2. Composed _____

Decomposed _____

Milliards	Millions				Thousands			Ones		
O	H	T	O	H	T	O	H	T	O	
5	4	0	0	1	5	9	0	2	4	



3. Composed _____

Decomposed $(7 \times 1,000,000,000) + (5 \times 10,000,000) + (4 \times 10,000) + (3 \times 1,000)$ $+ (5 \times 100) + (9 \times 1)$

Milliards	Millions				Thousands			Ones		
O	H	T	O	H	T	O	H	T	O	

PRACTICE

Solve the problems. Show your work.

1. Colony A has 268,820 Pharaoh Ants living in it. Decompose this numeral as you did in BUILD.
2. Yara's class learned that the distance from the Earth to the Moon can be written as $300,000 + 80,000 + 4,000 + 400$ kilometers. Compose this numeral.

Decompose the numerals that follow using expanded form.

3. 105,208

4. 2 million, 277 thousand, 191

5. three milliard, one hundred thirty-seven million, six hundred nineteen thousand, eighty-eight



What Is My Value? Follow the steps to explore how a digit's value changes when its location changes.

- Choose one digit and enter it in the Ones place.
- Record the value of the digit.
- Continue moving the digit card to the left on the place value chart, recording its new value each time.

Milliards	Millions				Thousands			Ones		
O	H	T	O	H	T	O	H	T	O	

My digit is _____

Value of my digit in the Ones place _____

Value of my digit in the Tens place _____

Value of my digit in the Hundreds place _____

Value of my digit in the Thousands place _____

Value of my digit in the Ten Thousands place _____

Value of my digit in the Hundred Thousands place _____

Value of my digit in the Millions place _____

Value of my digit in the Ten Millions place _____

Value of my digit in the Hundred Millions place _____

Value of my digit in the One Milliards place _____



**Creating the Greatest**

Play Creating the Greatest with a partner to practice creating numbers and writing them in multiple forms.

- Combine decks of digit cards with your partner. Place the cards face down in a pile and mix them up.
- Turn over 10 digit cards and record the numbers in the order in which you turned them over.
- Rearrange the 10 cards to create the greatest numeral.
- Record the numeral in standard form, word form, and expanded form.

1. _____

Standard Form _____

Expanded Form _____

Word Form _____

2. _____

Standard Form _____

Expanded Form _____

Word Form _____

3. _____

Standard Form _____

Expanded Form _____

Word Form _____



Complete the table:

	Standard Form	Expanded Form	Word Formures
1	565		
2			four thousand, seven hundred six
3	2,345,222,197		
4			eight milliard, four hundred twenty-seven million, nine hundred ninety-five thousand, forty-nine
5		6,000,000,000 + 400,000,000 + 30,000,000 + 6,000,000 + 20,000 + 3,000 + 500 + 4	



Form the greatest and the smallest number:

4 0 1 8 3 7 6 5 2 9

The greatest number:

The Smallest number:

4 5 1 9 3 7 6 5 2

The greatest number:

The Smallest number:

0 1 8 3 7 6 5 2 4



The greatest number:

The Smallest number:

4 1 0 3 7 6 5 2

The greatest number:

The Smallest number:

1 8 5 1 6 0 2 9

The greatest number:

The Smallest number:



Complete the following table:

Numbers	Milliards			Millions			Thousands			H T O		
	O	H	T	O	H	T	O	H	T	O	H	T
5 406 548 987												
3 589 021 479												
	5	4	6	3	9	8	7	1	5	9		
	1	6	4	7	8	5	2	0	8	2		



Complete:

- (1) 5,326,548,987 = billion, million, thousand &
- (2) 2,163,900,800 = billion, million, thousand &
- (3) 4,132,876,514 = billion, million, thousand &
- (4) 7,325,165,273 = billion, million, thousand &
- (5) 5,153,276,542 = billion, million, thousand &
- (6) 5,180,070,506 = billion, million, thousand &
- (7) 6,537,002,054 = billion, million, thousand &



Write the value and the place value of the red digit:

The number	The value	The place value
4,325,526,412
8,523,256,412
2,732,154,546
5,124,652,487
1,541,656,218
9,148,562,487
4,562,732,154



Homework

Compare the numbers below and circle the greater number in each row:

23,410	22,999
111,223	101,345
4,890	4,891



Use the digits 3, 5, 7, 8, 8, 1, 6, 2 to make the greatest number you can. Then use the same digits to make the smallest number you can.



What is the value of the following?

- A. 9 in the Tens place? _____
- B. 3 in the Hundreds place? _____
- C. 60 Tens? _____
- D. 80 Thousands? _____



Complete the table:

	Standard Form	Expanded Form	Word Formures
1	565		
2			four thousand, seven hundred six
3	2,345,222,197		
4			eight milliard, four hundred twenty-seven million, nine hundred ninety-five thousand, forty-nine
5		6,000,000,000 + 400,000,000 + 30,000,000 + 6,000,000 + 20,000 + 3,000 + 500 + 4	



Decompose the following numerals as you did in BUILD.

	Word Form	Decomposed
2	nine million, four hundred forty thousand, two hundred twenty	
3	six milliard, nine hundred million, ten thousand four	
4	eight million, seventy thousand, two hundred	
5	twenty-seven hundred	



Concept (2): Using the Place Value

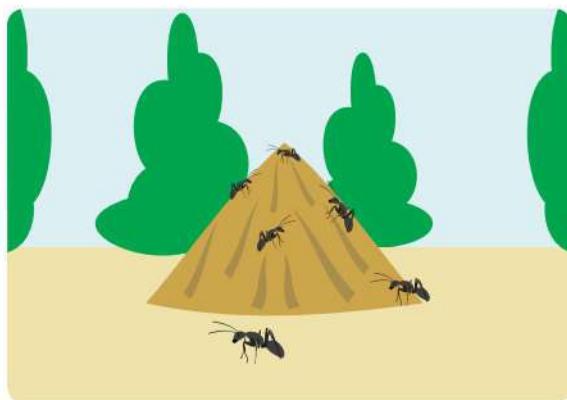
Circle the symbol to compare the numbers

1,231,425,234	> = <	1,321,454,435
67,353,622	> = <	67,353,630
40,243,021	> = <	40,209,314
999,999,999	> = <	1,000,000,000



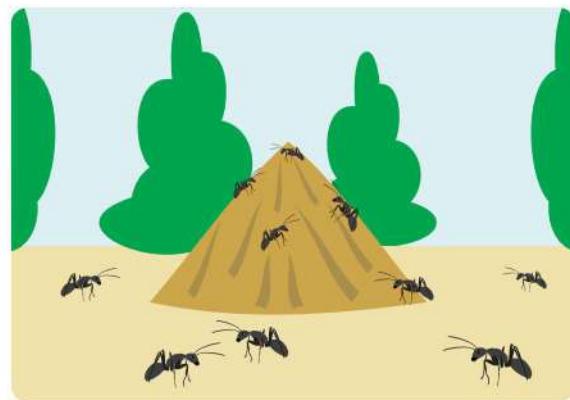
Comparing Anthills Highlight or circle the digits that are the same in both numbers.

Anthill 1



4,356

Anthill 2



4,502



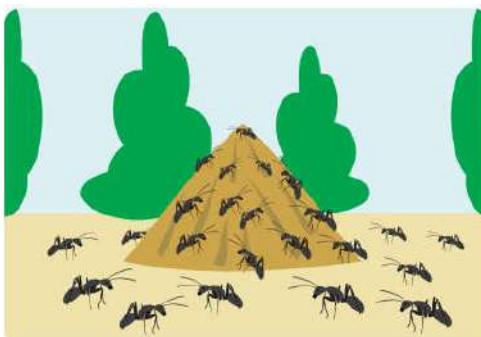
Complete using (<) , (>) or (=):



123,568



123,978



6,235,678



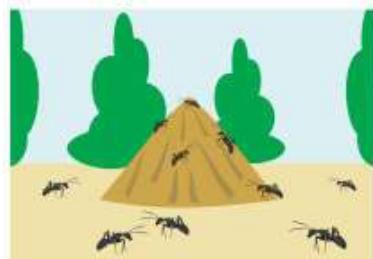
6,235,508

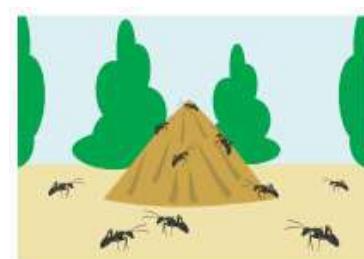


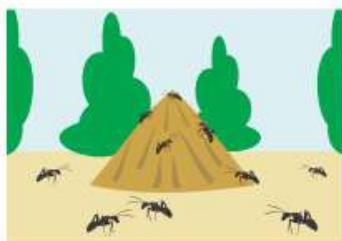
2,450,890,007

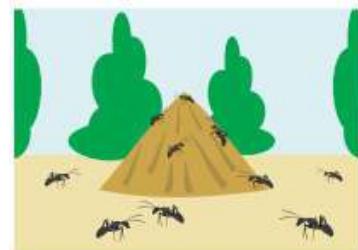


2,500,000,000



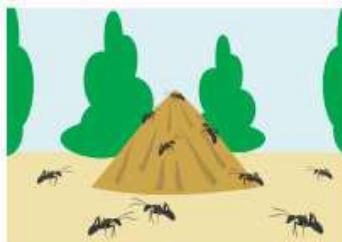
 $40,000 + 3,000 + 100 + 10$  $40,000 + 3,000 + 100 + 20$

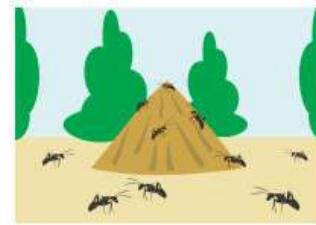




five milliard, two hundred
twenty million, five hundred-
six thousand, forty

five milliard, two hundred
twenty million, five hundred
forty thousand, six





one million, nine hundred
seventy-six thousand, eight
hundred eighty-eight

$1,000,000 + 900,000 + 70,000$
 $+ 6,000 + 800 + 80 + 8$



Complete:

- (1) The smallest 7-digit number is
- (2) The smallest 9-digit number is
- (3) The smallest different 8-digit number is
- (4) The smallest different 10-digit number is
- (5) The greatest 6-digit number is
- (6) The greatest 12-digit number is
- (7) The greatest different 7-digit number is
- (8) The greatest different 8-digit number is



Complete using (<), (>) or (=):

14,780,064		14,790,064
5,13,492,500		Five milliard, three hundred million, seven hundred fifteen thousand, forty-three
$(7 \times 100,000,000) + (4 \times 10,000,000) + (9 \times 10,000) + (8 \times 10) + (1 \times 10)$		$70,000 + 9,000 + 600 + 40 + 3$
Seventeen million, four hundred twenty-five thousand, six hundred five.		$(1 \times 10,000,000) + (7 \times 1,000,000) + (4 \times 100,000) + (2 \times 10,000) + (6 \times 100) + (5 \times 1)$
8,040,761,903		$8,000,000,000 + 400,000,000 + 700,000 + 60,000 + 1,000 + 900 + 3$
Four hundred twenty-three thousand, twelve		$400,000 + 30,000 + 20,000 + 20 + 1$



1. List Omar's data in ascending order:

78,090 79,010 78,091 79,100 78,999

_____ ; _____ ; _____ ; _____ ; _____



2. List Mariam's data in descending order. You may use word or standard form.

- three milliard, ten million, one thousand, thirty-four
- three milliard, one million, three hundred twenty-three thousand, three hundred ninety-one
- three milliard, nine hundred ninety thousand, nine hundred ninety-two
- three milliard, one hundred ten million, ninety-nine thousand, four hundred ninety-three



3. List the numbers in ascending order. Use the form in which they are given.

- four milliard, six hundred thousand, four
- 461,014
- four milliard six hundred thousand forty
- $(4 \times 1,000,000,000) + (4 \times 100,000) + (6 \times 10)$
- 6,400,042



4. List the following in ascending order. Use standard form.

- $(6 \times 100,000) + (5 \times 10,000) + (4 \times 1,000) + (3 \times 100) + (1 \times 1)$
- six hundred fifty-four thousand, three hundred ten
- 604,320
- $(6 \times 100,000) + (5 \times 10,000) + (4 \times 1,000) + (3 \times 100) + (1 \times 10) + (1 \times 1)$
- five hundred ninety-nine thousand, three hundred ten



5. List the numbers in descending order. Use standard form.

- 5,000,000,000 + 40,000,000 + 5,000,000 + 7,000 + 90
- $(6 \times 1,000,000,000) + (3 \times 10,000,000) + (5 \times 1,000,000) + (6 \times 10,000) + (9 \times 100)$
- five milliard, forty-one million, seven thousand, ninety
- 6,000,000,000 + 40,000,000 + 5,000,000 + 10,000 + 7,000 + 90
- 6,025,060,990

Predicting the Unpredictable

Use front-end estimation for each number in the table. Record your answer in standard form:

	Number	Front-End Estimation
1	78,920,416	
2	8,723	
3	Nine milliard, four hundred twelve million, seventy-six thousand, five	
4	Four hundred thousand, seven hundred ninety-five	
5	$9,000,000,000 + 800,000,000 + 70,000,000 + 5,000 + 60 + 5$	
6	$60,000,000 + 7,000,000 + 400,000 + 20,000 + 1,000 + 900 + 80 + 4$	
7	$(8 \times 10,000) + (6 \times 1,000) + (5 \times 100) + (2 \times 10) + (9 \times 1)$	



Circle the correct answer:

	Number	Front-End Estimate Choices		
8	19,780,506	9,000,000	OR	10,000,000
9	Eight hundred twenty five thousand, six hundred nineteen	800,000	OR	8,000,000
10	2,567,814,900	Two milliard	OR	2,000,000



Rounding

Rounding means replacing the exact number
by another simpler number, near to the exact number.

[1] Round each of the following to the nearest 1000:

126,237	≈	36,873	≈
33,500	≈	19,254	≈
821,799	≈	49,500	≈
2,231,274	≈	233,695	≈



[2] Round each of the following to the nearest 10,000:

15,000	≈	52,600	≈
78,000	≈	92,000	≈
456,450	≈	69,224	≈
45,274	≈	88,695	≈



[3] Round each of the following to the nearest 100,000:

250,000	≈	275,600	≈
878,000	≈	990,000	≈
456,450	≈	469,224	≈
645,274	≈	988,695	≈



[4] Round each of the following to the nearest 1,000,000:

3,250,000 \approx

23,275,600 \approx

7,878,000 \approx

4,990,000 \approx

10,456,450 \approx

45,469,224 \approx

65,645,274 \approx

123,988,695 \approx



[5] Round each of the following to the nearest 1,000,000,000:

2,323,250,000 \approx

6,223,275,600 \approx

8,247,878,000 \approx

7,504,990,000 \approx

4,010,456,450 \approx

6,045,469,224 \approx

5,665,645,274 \approx

2,123,988,695 \approx



[8] Choose the correct answer:

- a) 17085 \approx 17000 to the nearest..... (10 , 100 , 1000)
- b) 8453 \approx 8500 to the nearest..... (10 , 100 , 1000)
- c) 75643.1 \approx 75600 to the nearest..... (10 , 100 , 1000)
- d) 3725.6 \approx 3730 to the nearest..... (10 , 100 , 1000)



PRACTICE

Follow the directions in each problem to round each number to the given place. Use the midpoint strategy or the Rounding Rule strategy.

1. A plane's altitude increased by 2,721 meters. Round this number to the nearest Thousand.
2. A runner ran 1,537 meters but describes the distance he ran with a rounded number. Round 1,537 to the nearest Hundred.
3. A record number of 23,386 ants live in colony A. Round this number to the nearest Ten Thousand.



Try This! Round to the place value of the underlined digit.

A 64,999

C 301,587

B 850,000

D 10,832



Round to the place value of the underlined digit.

2. 934,567

3. 641,267

4. 234,890

5. 347,456

6. 562,408

7. 284,792

8. 199,814

9. 923,718



12. **THINK SMARTER** About 300,000 people attended a festival.

For numbers 12a–12e, choose Yes or No to show whether each number could be the exact number of people that attended the festival.

12a. 351,213

Yes No

12b. 249,899

Yes No

12c. 252,348

Yes No

12d. 389,001

Yes No

12e. 305,992

Yes No



Homework

Create a number in the Hundred Thousands that is less than (<) 893,824.

Create a number in the Ten Millions that is greater than (>) 34,450,600,125.

Create a number in the Milliards that is greater than (>) 3,456,789,000.



Round the numbers below to the Thousands place.

1. 9,621 ≈
2. 42,502 ≈
3. 3824,157 ≈

Round the numbers below to the Hundreds place.

4. 410,671 ≈
5. 423,502 ≈
6. 1,632,542 ≈



Rewrite the numerals that follow in standard form. Then, list the numerals in descending order (greatest to least).

six hundred forty-three thousand, nine hundred nineteen

634,920

$(6 \times 100,000) + (4 \times 10,000) + (3 \times 1,000) + (9 \times 100) + (2 \times 10)$

$600,000 + 40,000 + 4,000 + 10$

six hundred thirty-four thousand, two hundred ninety-nine

Standard Form	Descending Order



Use front-end estimation for the following numbers:

2. 86,433,920

3. 6,627,513,202

4. One hundred sixty-three million, four hundred thirty thousand, eight hundred two





UNIT

2

Theme 1 | Number Sense and Operations

Unit 2

Addition and Subtraction Strategies



Concept (1)

Using Addition & Subtraction Strategies

Additive Identity Property Solve the following problems.

$2,345 + 0$

$0 + 12,567,109$



Commutative Property Solve the following problems.

$5 + 7 + 8 + 3$

$8 + 7 + 3 + 5$

$7 + 5 + 8 + 3$

$3 + 7 + 8 + 5$



Associative Property Solve the following problems. Remember to solve what is in the parentheses first.

$(10 + 4) + 20 + 17$

$10 + (4 + 20) + 17$

$10 + 4 + (20 + 17)$



1. Select the *best* answer to correctly complete the statement.

Additive Identity

Associative

Commutative

$4 + 6 = 6 + 4$ is true because of the _____
Property of Addition.



2. Which of these statements is true regarding the sum of $16 + 0$?

- A. $16 + 0 = 16$ because any number added to 0 will equal that number.
- B. $16 + 0 = 0$ because any number added to 0 will equal zero.
- C. $16 + 0 = 1 + 6$ because the addends can be grouped in any way.
- D. $16 + 0 = 6 + 1$ because the addends can be combined in any order.



3. Jabari writes $12 - (8 + 1) = (12 - 8) + 1$. Is the statement true?

- A. Yes, because the Associative Property applies to subtraction.
- B. Yes, because the Commutative Property applies to subtraction.
- C. No, because the Associative Property does not apply to subtraction.
- D. No, because the Commutative Property does not apply to subtraction.



Mental Math Strategies

1. $304 + 399 = 703$

Student explanation: I used **Compensate to Make a Benchmark**.

I thought of 399 as 400. $304 + 400$ is 704 but I added one too many, so I took one away to get the sum. $704 - 1 = 703$.

2. $785 - 770 = 15$

Student explanation: I used **Add to Subtract**. I counted up from 770 to get to 785.

3. $489 + 134 = 623$

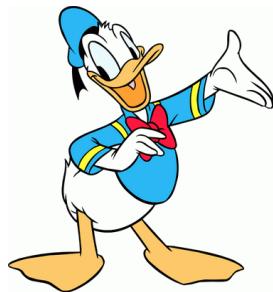
Student explanation: I use **Break Up and Bridge**. I added $400 + 100$ to get 500. I added $80 + 30$ to get 110, so already I know $500 + 110$ is 610. Then I added $9 + 4$ to get 13, so $610 + 13 = 623$.

4. $74 - 19 = 55$

Student explanation: I used **Compensate to Make a Benchmark**. I thought of 19 as 20. $74 - 20 = 54$ but I took off one too many, so I needed to add one back. $54 + 1 = 55$.

5. $156 - 47 = 109$

Student explanation: I used **Break Up and Bridge**. I broke up 47 into 40 and 7. I took 40 away from 156 and got 116. Then I took away 7 more and found the difference was 109.



BUILD

Solving with Mental Math Strategies Use the chart that follows to help you practice the strategies as you solve the problems mentally. Try each strategy at least one time.

Front-End Estimation	Add or subtract only the largest place values in each number to produce an estimate (that may not be close to the actual answer). For example, in the problem $167 - 83$, you can think $100 - 80 = 20$.
Rounding	Select one place value for each number. Determine which multiple of 10, 100, 1,000 (and so on) it is closest to and then add or subtract for a more accurate estimate. For example, in the problem $167 - 83$, you can think $170 - 80 = 90$ (a far more accurate estimate).
Compensate to Make a Benchmark Number	Regroup the numbers in a problem to create numbers that are easier to add or subtract mentally. For example, with $59 + 22$, you can think “ $60 + 22$ is 82 but I added one too many so the sum will be 1 less, or 81.” Or for subtraction, with $17 - 9$, you can think “ $17 - 10$ is 7, but I subtracted 1 too many, so the difference is one more, or 8.”
Break Up and Bridge	Break up the number being added or subtracted into numbers that are easier to add or subtract mentally (expanded form can help). For example, with $92 - 26$, you can think “ $92 - 20$ is 72 and then take 6 more away is 66,” or for $537 + 208$, you can think, “ 537 and 200 is 737 , and 737 plus 8 is 745 .”
Add to Subtract	Count up from the subtrahend to the minuend. For example, with $92 - 67$, you can think “ $67 + 3 = 70$; $70 + 20 = 90$; $90 + 2 = 92$. $3 + 20 + 2 = 25$, $92 - 67 = 25$.”



Match which mental math strategy would work best for each problem.
There may be more than one best answer.

**Compensate to
Make a Benchmark**

Break Up and Bridge

Add to Subtract

1. $169 + 32$

2. $802 - 789$

3. $64 + 89$

4. $44 - 23$



Find the sum. 546
 $+ 215$
 $\underline{\quad}$

- A. 331
- B. 751
- C. 756
- D. 761

Find the difference. 423
 $- 118$
 $\underline{\quad}$

- A. 305
- B. 306
- C. 315
- D. 341



Homework

Select the best answer to complete each statement.

Additive Identity

Associative

Commutative

Jamal wrote $(14 + 6) + 21 = 14 + (6 + 21)$ using the

Property of Addition.

He wrote $33 + 16 = 16 + 33$ using the

Property of Addition. He wrote $28 + 0 = 28$ using the

Property of Addition.



A student writes the statement $87 - 52 = 52 - 87$. Why is this statement incorrect?

- A. The Associative Property applies to addition but not subtraction.
- B. The Commutative Property applies to addition but not subtraction.
- C. The Associative Property applies to subtraction but not addition.
- D. The Commutative Property applies to subtraction but not addition.



Obaid found that $29,828 + 41,309 = 71,137$. Which estimate could he use to check if his answer is reasonable?

- A. $30,000 + 50,000 = 80,000$
- B. $20,000 + 50,000 = 70,000$
- C. $30,000 + 40,000 = 70,000$
- D. $20,000 + 40,000 = 60,000$



Problem	Mental Math Strategy Chosen	Solution	Was this an effective strategy? Why or why not?
$17 + 29$			
$92 - 11$			
$101 - 98$			
$32 + 11$			
$76 - 68$			
$83 + 17$			



Adding with Regrouping

Find the result:

a
$$\begin{array}{r} 3785421 \\ + 210234 \\ \hline \end{array}$$

b
$$\begin{array}{r} 4891243 \\ + 3102315 \\ \hline \end{array}$$

c
$$\begin{array}{r} 658876 \\ + 6734538 \\ \hline \end{array}$$

d
$$\begin{array}{r} 6543000 \\ - 4242788 \\ \hline \end{array}$$

e
$$\begin{array}{r} 7008198 \\ - 819485 \\ \hline \end{array}$$

f
$$\begin{array}{r} 8000000 \\ - 3514679 \\ \hline \end{array}$$



Estimate and Solve Work with your partner to estimate the sums and then solve the problems.

1. $579 \rightarrow$
 $+ 62 \rightarrow +$

2. $8,049 \rightarrow$
 $+ 6,199 \rightarrow +$



A colony of ants is on a march through the jungle looking for food. On this march they made 2 bridges. The first bridge is composed of 142 ants. The second bridge is composed of 165 ants. How many ants were needed for both bridges? Show your work. Then, explain how you know your answer is reasonable.



Estimate

Exact



Abeer and Ehab are traveling from Aswan to Alexandria. They will travel 514 km on the first day to Asyut. They will travel 597 km from Asyut to Alexandria on the second day. How many kilometers will they travel in all?



A Saharan Silver ant is the fastest ant on the planet. It can move about 855 mm a second. If this ant could maintain this speed for 2 seconds, how far would it go?



	Species	Total	Round Each Number to the Nearest Thousand
1.	Black Garden Ants	58,712	
2.	Pavement Ants	81,475	
3.	Pharaoh Ants	42,358	



4. How many ants would you have if you combined the Pharaoh Ants and the Pavement Ants? Use your rounded numbers from the table to estimate, and then find the exact answer.



5. What is the total amount of ants? Use your rounded numbers from the table to estimate, and then find the exact answer.



Subtraction Strategies

Counting Back with Decomposition

Draw an open number line and write the minuend at the right end of the line. Decompose the subtrahend into expanded form. Count back from the minuend using the expanded form of the subtrahend. For example, with $312 - 116$, you can write 312 at the right end of a number line, and then break 116 into $100 + 10 + 6$. Count back on the number line using the expanded form: $312 - \mathbf{100} = 212$; $212 - \mathbf{10} = 202$; $202 - \mathbf{6} = 196$. So, $312 - 116 = 196$.

Counting Up with Decomposition

Draw an open number line and write the subtrahend at the left end of the line. Decompose the minuend into friendly numbers or using expanded form. Count up from the subtrahend to the minuend, recording the jumps and the new sums. Add the jumps together to find the difference. For example, with $312 - 116$, you can write 116 at the left end of a number line, and then make “friendly” jumps to get to 312: $116 + \mathbf{100} = 216$; $216 + \mathbf{4} = 220$; $220 + \mathbf{80} = 300$; $300 + \mathbf{12} = 312$. $100 + 4 + 80 + 12 = 196$. So, $312 - 116 = 196$.



Problem		Mental Math Strategy Chosen	Solution	Was this an effective strategy? Why or why not?
1	$340 - 204$			
2	$2,402 - 104$			
3	$789 - 329$			
4	$67 - 18$			



Subtraction with regrouping

A trap jaw ant wanted to cross a river that was 3,548 cm across. The ant had already swum 1,672 cm. How much farther does the ant have to go?



Two colonies of fire ants were stuck in a flood and made floating rafts to survive. The first colony had approximately 1,267 ants and the second had 3,452 ants. How many more ants were in the second colony?



A fire ant colony 255,000 ants. A *Gigantiops destructor* ant colony has 6,200. What is the difference between the size of the two colonies?



Homework

Using 10s Follow your teacher's directions to mentally solve the problems.

1. $3 + 7$
2. $3 + 5 + 7$
3. $7 + 6 + 3$

4. $9 + 1$
5. $1 + 7 + 9$
6. $9 + 6 + 1$

7. $7 + 7 + 3 + 3$
8. $9 + 9 + 1 + 1$



It takes 15,422,140 ants to move a log that weighs 77 kg. It takes approximately 6,350,300 ants to move a rock that weighs 32 kg. How many more ants does it take to move the log than the rock?



Use the subtraction algorithm to solve the problems. Then, round each number to the nearest Thousand to check the reasonableness of your answers.

1. 6,625

 — 4,417

2. 23,640

 —14,635

3. 25,884

 —18,875

4. 1,816

 — 1,066



Concept (2): Solving Multistep Problems

Bar Models, Variables, and story problems

There are 5,328 ants in the colony. In the colony, 2,164 ants are females and the rest are males. How many male ants are in the colony?

Bar Model:



Equation

Solution



There are 20,000 ants in the colony. In the colony, 12,000 are females and the rest are males. How many male ants are in the colony?

Bar Model:



Equation

Solution



In colony A there are 1,200 ants. Some ants are out foraging for food and supplies, and 700 ants are taking out the colony's trash. How many ants are foraging for food and supplies?

Bar Model:



Equation

Solution



There are 12,000 species of ants. Of these 12,000 species, 2,500 species live in Africa and the rest live in other parts of the world. How many species do not live in Africa?

Bar Model:

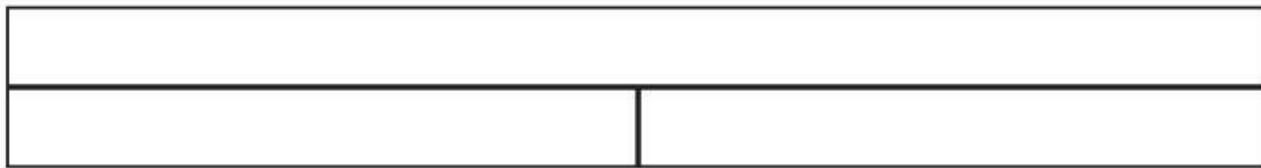


Equation

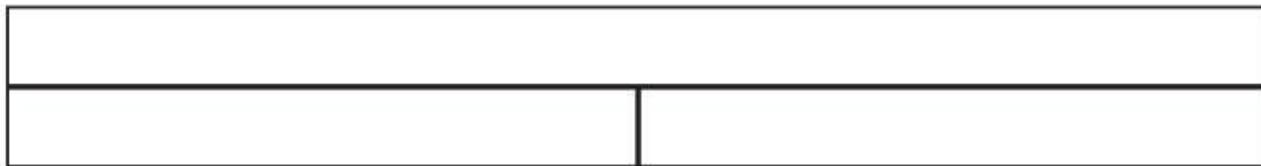
Solution



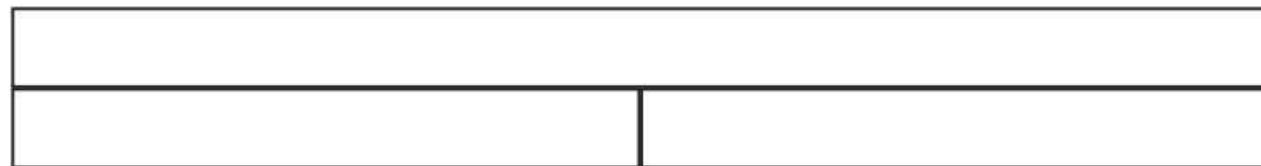
$$14,000 - n = 6,000$$

Bar Model:**Solution**

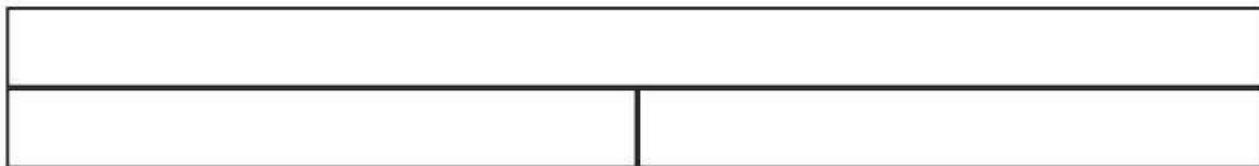
$$b - 53,500 = 75,200$$

Bar Model:**Solution**

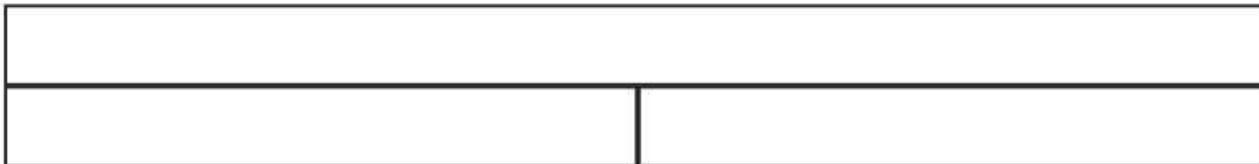
$$725,625 + c = 935,075$$

Bar Model:**Solution**

$$13,280 - d = 5,420$$

Bar Model:**Solution:**

$$e + 205,925 = 810,775$$

Bar Model:**Solution:**

Omar found a website created to study ant colonies. He saw that there were 1,025 ants in Colony A on Wednesday. On Friday, 101 ants leave the colony. How many ants are left in Colony A?



Mariam found the same website and saw that there were 1,555 ants in Colony B. How many more ants are in Colony B than in Colony A?



The Great Pyramid had 59,000 visitors in January, 27,525 visitors in February, and 32,975 visitors in March. They expect to have 150,000 visitors by the end of April. How many visitors need to show up in April to reach this count?



New Valley has a population of 256,088. If Matrouh has a population of 429,999 and South Sinai has a population of 108,951, how many more people do Matrouh and South Sinai have combined than New Valley?



The Nile River is approximately 6,650 kilometers long. Kareem and his family travel the Nile River from one end to the other end. If they travel 1,075 kilometers in January, then 1,120 kilometers in February, and then 1,325 kilometers in March, how many more kilometers do they still need to travel to reach the other end?



Aswan has a population of 1,575,914. If Luxor has a population of 1,333,309 and Red Sea has a population of 383,796, how many more people do Luxor and Red Sea have combined than Aswan?



Hazem and Menna are monitoring ant colonies on the website. Hazem has been monitoring an ant colony with 132,890 ants. Menna has been monitoring an ant colony with 57,024 ants and another colony with 72,999 ants. Who has been monitoring more ants? How many more?



Homework

A coffee pot held 1,425 milliliters of coffee. Rashida filled her mug with 730 milliliters of coffee from the pot. Then she poured 460 milliliters for her friend. How can you find out how much coffee was left in the pot? Select two correct answers.

- A. Add the 730 milliliters Rashida poured in her mug to the 1,425 total milliliters that were in the coffee pot to begin with. Then subtract the 460 milliliters Rashida poured in her friend's mug.
- B. Subtract the 730 milliliters Rashida poured in her mug from the 1,425 milliliters that were in the coffee pot to begin with. Then subtract the 460 milliliters Rashida poured in her friend's mug.
- C. Add the 460 milliliters Rashida poured in her friend's mug to the 1,425 total milliliters that were in the coffee pot to begin with. Then subtract the 730 milliliters Rashida poured in her mug.
- D. Subtract the 460 milliliters Rashida poured in her friend's mug from the 1,425 total milliliters that were in the coffee pot to begin with. Then subtract the 730 milliliters Rashida poured in her mug.
- E. Add the 730 milliliters Rashida poured in her mug to the 1,425 total milliliters that were in the coffee pot to begin with. Then add the 460 milliliters Rashida poured in her friend's mug.
- F. Add the 460 milliliters Rashida poured in her friend's mug to the 1,425 total milliliters that were in the coffee pot to begin with. Then add the 730 milliliters Rashida poured in her mug.



What is the value of x ? $111 + x = 481$

- A. 260
- B. 370
- C. 471
- D. 592

A ship entered port with 611 tonnes of cargo. It picked up a 25-tonne shipment of fresh fruit and a 149-tonne shipment of electronics before it left port. How much cargo did the ship leave port with?

- A. 437 tonnes
- B. 636 tonnes
- C. 760 tonnes
- D. 785 tonnes



A water truck was filled with 4,000 liters of water. It delivered 1,250 liters to its first client. It delivered 620 liters to its second client. It delivered 2,120 liters to its last client. How much water was left in the truck?

- A. 10 liters
- B. 50 liters
- C. 2,130 liters
- D. 7,990 liters



A seamstress had a 21-meter bolt of cloth. She used some of the cloth to make a dress and had 15 meters left over. Let c represent the amount of cloth. Which equation represents this problem?

- A. $15 - c = 21$
- B. $21 - c = 15$
- C. $15 + c = 21$
- D. $21 + c = 15$





UNIT

3

Theme 1 | Number Sense and Operations

Unit 3

Concepts of

Measurement



Photo Credit: Vaginando_City / Shutterstock.com

Concept (1): Metric Measurements

Measurement Review Circle the best unit to measure each length.

1. Height of a student

Kilometer Meter Centimeter Millimeter

2. Distance between home and school

Kilometer Meter Centimeter Millimeter

3. Length of the Nile River

Kilometer Meter Centimeter Millimeter

4. Length of an ant

Kilometer Meter Centimeter Millimeter

5. Distance from Cairo to Alexandria

Kilometer Meter Centimeter Millimeter



Fill in the blanks to answer the following questions. Think of things that could be measured in each unit.

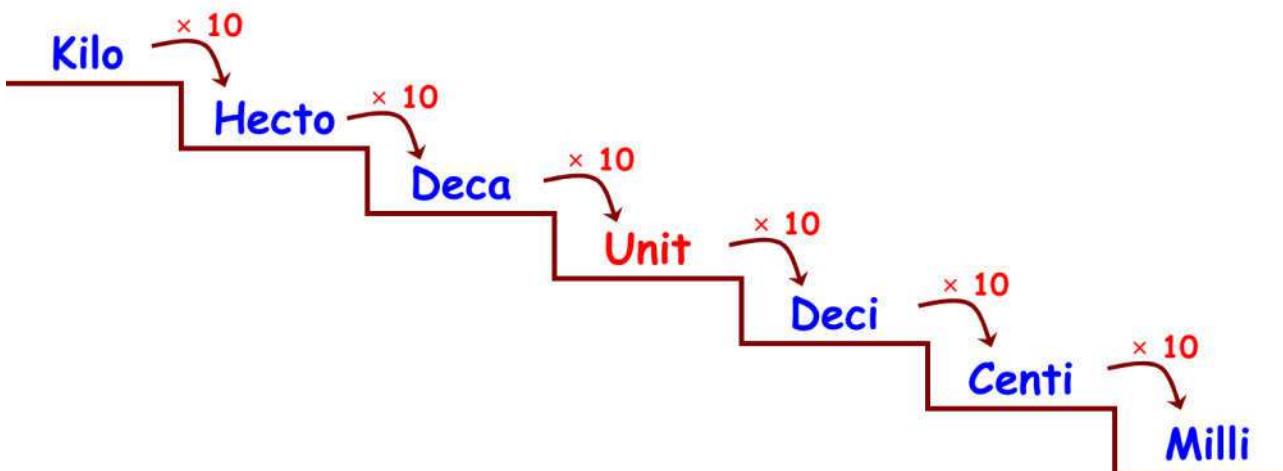
6. _____ is best measured in kilometers

because _____.



Metric Units View and discuss the Metric Conversion chart with your Shoulder Partner.

Kilo-	Hecto-	Deca-	Unit	Deci-	Centi-	Milli-
1,000 units	100 units	10 units	1 unit	1/10 unit	1/100 unit	1/1,000 unit



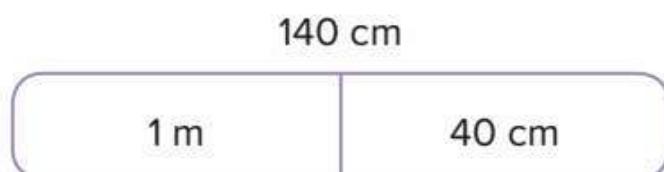
	Kilometer	Meter
1		1,000
2	3	
3		40,000



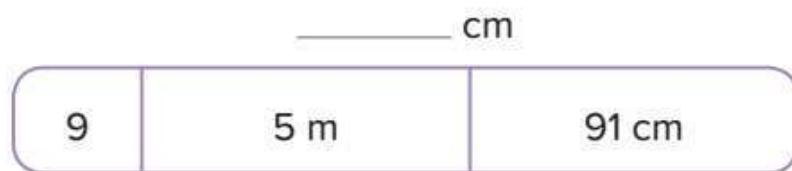
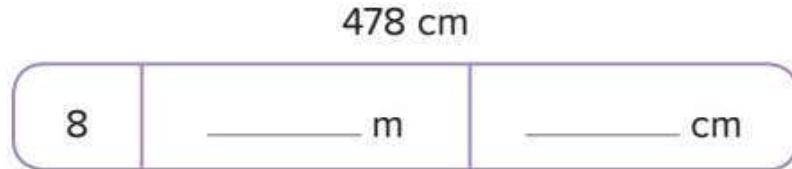
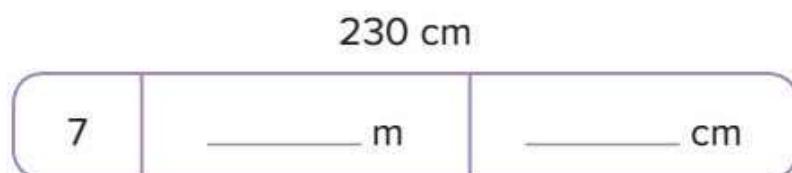
	Meter	Centimeter
4	1	
5		300
6	10	



Look at the following example:



Convert the following lengths into the given units in the bar models. Use the previous example to help you.



Convert the following.

1. $4 \text{ m } 18 \text{ cm} = \underline{\hspace{2cm}}$ cm
2. $18 \text{ m } 14 \text{ cm} = \underline{\hspace{2cm}}$ cm
3. $8 \text{ km } 14 \text{ m} = \underline{\hspace{2cm}}$ m
4. $27 \text{ km } 55 \text{ m} = \underline{\hspace{2cm}}$ cm



5. If one black ant can walk 250 meters in 1 hour, how many hours will it take to walk 1 kilometer?



6. If the same black ant walked for 10 hours, how far would it go? Express your answer in kilometers and meters.



Work with a partner to complete the conversions. Use the previous example to help you.

1. $3 \text{ kg} = \underline{\hspace{2cm}}$ g
2. $8 \text{ kg} = \underline{\hspace{2cm}}$ g
3. $\underline{\hspace{2cm}} \text{ kg} = 5,000 \text{ g}$
4. $4 \text{ kg} = \underline{\hspace{2cm}}$ g
5. $\underline{\hspace{2cm}} \text{ kg} = 30,000 \text{ g}$



6. 4,590 g

_____ kg	_____ g
----------	---------



7. 8,400 g

_____ kg	_____ g
----------	---------



8. _____ g

7 kg	414 g
------	-------



9. A colony of black ants is estimated to weigh 3,493 grams.

Rewrite that number using kilograms and grams.



A different ant colony is estimated to weigh 14 kilograms and 89 grams. Rewrite that weight in grams.



PRACTICE

1. Convert:

$$2,456 \text{ g} = \underline{\hspace{2cm}} \text{ kg} \underline{\hspace{2cm}} \text{ g}$$

2. Convert:

$$5,235 \text{ g} = \underline{\hspace{2cm}} \text{ kg} \underline{\hspace{2cm}} \text{ g}$$

3. Convert:

$$7,324 \text{ g} = \underline{\hspace{2cm}} \text{ kg} \underline{\hspace{2cm}} \text{ g}$$

4. Convert:

$$4,535 \text{ g} = \underline{\hspace{2cm}} \text{ kg} \underline{\hspace{2cm}} \text{ g}$$



1. $6 \text{ L} = \underline{\hspace{2cm}} \text{ mL}$

2. $9 \text{ L} = \underline{\hspace{2cm}} \text{ mL}$

3. $\underline{\hspace{2cm}} \text{ L} = 6,000 \text{ mL}$

4. $3 \text{ L} = \underline{\hspace{2cm}} \text{ mL}$

5. $\underline{\hspace{2cm}} \text{ L} = 10,000 \text{ mL}$



9,425 mL

$\underline{\hspace{2cm}}$	$\underline{\hspace{2cm}}$
L	mL



6,360 mL

_____ L	_____ mL
---------	----------



_____ mL

8 L	910 mL
-----	--------



_____ mL

A car is filled with 45 liters of petrol. How many milliliters would that be?



_____ mL

A family drank 1 liter 500 milliliters of orange juice at breakfast. If there were 3 liters of orange juice before breakfast, how much orange juice is left?



_____ mL

A car was filled with 20 liters 500 milliliters of petrol. At the end of the day, there were 15 liters 250 milliliters left in the tank. How much petrol was used?

10. Use the recipe that follows to answer the questions.

Sobia Ingredients:

- 100 g raw short grain rice
- 500 mL of water
- 750 mL cold milk
- 100 g caster sugar
- 5 mL vanilla
- 500 mL coconut milk

Which ingredients are measured by mass?

Which ingredients are measured by capacity?

What is the total amount of liquid ingredients in the drink in milliliters? In liters?



Doha's fish tank contains 5 liters 245 milliliters of water. If the tank can hold 10 liters of water, how much more water does she need to fill the tank?



Kilo-	Hecto-	Deca-	Unit	Deci-	Centi-	Milli-
1,000 units	100 units	10 units	1 unit	1/10 unit	1/100 unit	1/1,000 unit
Kilometer (km)	Hectometer (hm)	Decameter (dam)	Meter (m)	Decimeter (dm)	Centimeter (cm)	Millimeter (mm)
			Gram			
			Liter			



Which sentence *best* explains the relationship between a meter and a centimeter?

- A. A meter is equal to 100 centimeters.
- B. A meter is equal to 10 centimeters.
- C. A centimeter is equal to 100 meters.
- D. A centimeter is equal to 10 meters.



Kilometers	Meters	Centimeters
4	?	?

Which two answer choices *best* complete the table?

- A. 40
- B. 400
- C. 4,000
- D. 40,000
- E. 400,000



A company sells laundry soap to businesses in containers of the following sizes.

Container A: 3,000 liters

Container B: 3,000 milliliters

Container C: 300 liters

Which list shows the containers from least to greatest capacity?

- A. Container A, Container B, Container C
- B. Container A, Container C, Container B
- C. Container C, Container B, Container A
- D. Container B, Container C, Container A



1. An ant traveled 8 meters from its nest to forage for food. How far is this in centimeters?

Equation: _____



A colony of army ants has been known to consume 2 kilograms of food in a month. How many grams of food are consumed by the colony?

Equation: _____



17. **THINK SMARTER** Select the correct word to complete the sentence.

Justine is thirsty after running two miles.

She should drink 1 liter 1 meter 100 millimeters of water.



Homework

Convert to centimeters:

1. $6 \text{ m} =$

2. $20 \text{ m } 10 \text{ cm} =$



Convert to meters:

3. $23 \text{ km} =$

4. $800 \text{ km } 50 \text{ m} =$



5. A worker ant walked 3,500 meters on Monday to look for food and 2,450 meters on Tuesday to look for food. How far did the ant travel on Monday and Tuesday combined? Express your answer in meters, and then convert to a combination of kilometers and meters.



Convert each of the following.

1. $3,806 \text{ g} = \underline{\hspace{2cm}} \text{ kg} \underline{\hspace{2cm}} \text{ g}$

2. $8 \text{ kg } 50 \text{ g} = \underline{\hspace{2cm}} \text{ g}$

3. $3,425 \text{ g} = \underline{\hspace{2cm}} \text{ kg} \underline{\hspace{2cm}} \text{ g}$

4. $1 \text{ kg } 10 \text{ g} = \underline{\hspace{2cm}} \text{ g}$

5. $10,452 \text{ g} = \underline{\hspace{2cm}} \text{ kg} \underline{\hspace{2cm}} \text{ g}$



Express the answers in milliliters.

1. $21 \text{ L } + 2 \text{ L } 800 \text{ mL} =$

2. $4 \text{ L } 485 \text{ mL } - 323 \text{ mL} =$



Convert.

3. $11 \text{ L } 342 \text{ mL} = \underline{\hspace{2cm}} \text{ mL}$

4. $16,783 \text{ mL} = \underline{\hspace{2cm}} \text{ L } \underline{\hspace{2cm}} \text{ mL}$



Concept (2): Time and Scaled Measurement

Table 1	
Hours	Minutes
1	60
2	
3	
4	
5	
6	
7	
8	
9	
10	

Table 2	
Hours	Minutes
1	60
2	
3	
4	
5	
6	
7	
8	
9	
10	

Table 3	
Days	Hours
1	24
2	
3	
4	
5	
6	
7	
8	
9	
10	

Table 4	
Weeks	Days
1	7
2	
3	
4	
5	
6	
7	
8	
9	
10	

Solve the conversion problems using the ratio tables above.

5. 10 hours 30 minutes = _____ minutes

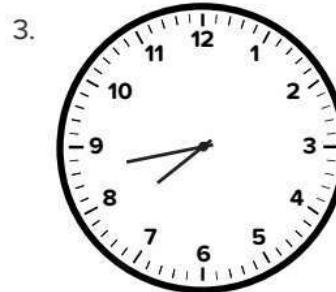
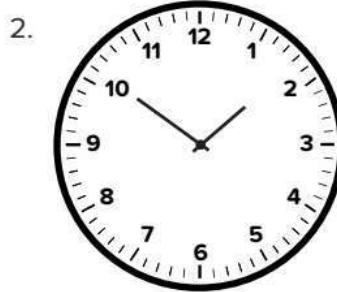
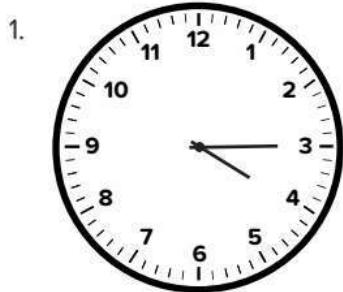
6. 6 minutes 15 seconds = _____ seconds

7. 4 days 20 hours = _____ hours



PRACTICE

Write the digital time that is shown on each analog clock.



Solving Elapsed Time Problems Solve the problems and write the new time. Based on the examples shown to you by your teacher, try a few different strategies to solve the problems. Show your work.

1. $3:25 + 1:26 =$ _____
2. $3:25 + 45 \text{ minutes} =$ _____
3. $5:43 - 1:25 \text{ minutes} =$ _____
4. Jana and Maha have 5 hours to watch three movies that last 1 hour and 22 minutes; 2 hours and 12 minutes; and 1 hour and 57 minutes.

Do the girls have enough time to watch all three movies? How do you know?

The girls decide to just watch the two shortest movies. If they start watching them at 5:30 p.m., what time will their movies end?



5. A worker ant went out to find food for the colony. It left at 6:30 a.m. and returned at 7:42 a.m. How long was that ant looking for food?



Fun with Facts Match the Fact Family with the number that belongs in the blank.

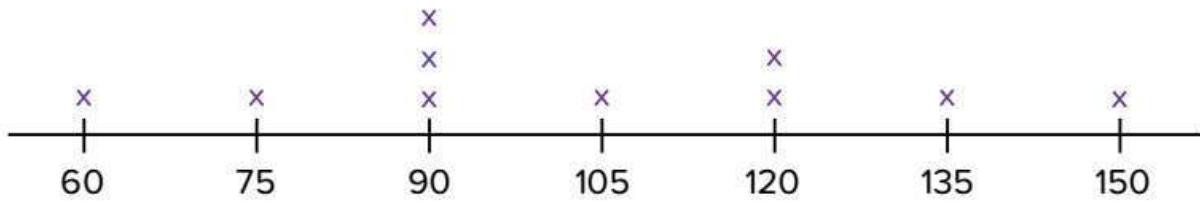
1. 6, 48, _____	a. 45
2. 8, 72, _____	b. 11
3. 9, 5, _____	c. 8
4. 44, 4, _____	d. 9



Use the following line plot to answer the following questions.

Number of Minutes Studied

X = 2 students



1. What is being measured?
2. What is the scale for the number line?

For Problems 3–5, record your answer in total minutes and then convert your answer to hours and minutes.

3. What was the least amount of time spent studying?



4. What was the most amount of time spent studying?

5. What was the most common amount of time spent studying?



Choose the correct Answer:

(1) 9 km = m	(9 , 90 , 900 , 9,000)
(2) 3 km = decameter	(3 , 30 , 300 , 3,000)
(3) 2 hectometers = m	(2 , 20 , 200 , 2,000)
(4) 40,000 mm = m	(4 , 40 , 400 , 4,000)
(5) 7 decagrams = gm	(7 , 70 , 700 , 7,000)
(6) 6 kg = decagrams	(6 , 60 , 600 , 6,000)
(7) 8 kg = hectograms	(8 , 80 , 800 , 8,000)
(8) 9 Liters = ml	(9 , 90 , 900 , 9,000)
(9) 5,000 deciliters = L	(5 , 50 , 500 , 5,000)
(10) 100 dam = hm	(1 , 10 , 100 , 1,000)



Concept (3): Measurement All Around

1. The potatoes Aya bought weighed 2 kilograms 920 grams. Her onions weighed 1,075 grams less than the potatoes. How much did the potatoes and onions weigh together?



2. A pharaoh ant grows from egg to adult in 45 days. A carpenter ant grows from egg to adult in 12 weeks. Which species takes longer to grow from egg to adult? How much longer?



3. A fish tank with a capacity of 100 liters is filled with 20,000 milliliters of water. How many more liters of water are needed to fill it up completely?



4. Zeina purchased 8 kilograms of sugar, 10 kilograms of flour, 500 grams of cocoa, 225 grams of pecans, and 275 grams of coconut. What is the total mass of her groceries in kilograms?



Mr. Emad bought four 2-liter bottles of soda for the Primary 4 picnic. If there were 2 liters and 829 milliliters of soda remaining at the end of the party, how many milliliters of soda did the students drink?

Worker ants take power naps totaling up to 250 minutes a day. A queen ant may sleep up to 9 hours a day. Which ant sleeps longer and by how many minutes?



Ahmed has a 12-meter-long piece of wood. He wants to cut it into 3 equal lengths. How long should each cut piece be in meters? How long will each of these pieces be in centimeters?



Ayman is a runner. While Ayman is in training, he needs to drink 500 milliliters of water 4 times per day. How many liters of water will that be for 1 week?



Ehab is a weightlifter. He has a mass of 100 kilograms. His aim is to gain 500 grams per week. If he does that for 5 weeks, what will his mass be at the end?



Homework

Solve. Show your work.

1. $3:45 + 25 \text{ min} = \underline{\hspace{2cm}}$

2. $2:45 + 6:17 = \underline{\hspace{2cm}}$

3. $3:07 - 42 \text{ min} = \underline{\hspace{2cm}}$

4. $5:07 - 2:13 = \underline{\hspace{2cm}}$



5. An ant's first nap of the day began at 7:45 a.m. and lasted for 60 seconds. What time did the ant wake up?



6. The ant then worked in the colony for 3 hours and 13 minutes before its next nap. What time did the ant take his second nap?



A clock is shown.



What time does the clock show?

- A. 10:04
- B. 10:01
- C. 1:10
- D. 1:50



Bast's school day is 5 hours long. How can she find how long the school day is in minutes?

- A. multiply 5 by 60
- B. add 5 and 60
- C. multiply 5 by 24
- D. add 5 and 24



Bakari is going on a trip for 2 full days. How could he figure out how many hours he will be away?

- A. add 2 and 24
- B. multiply 2 by 24
- C. add 2 and 60
- D. multiply 2 by 60



Taher grew 10 centimeters in 1 year. He is now 1 meter 6 centimeters tall. How many centimeters tall was Taher 1 year ago?



An ant from Colony A walked 2 kilometers in a day. An ant from Colony B walked 3,000 meters in a day. Which ant walked the farthest and how much farther in kilometers did it walk?



Ali's cat weighs 7 kilograms and his dog weighs 17 kilograms. When Ali took them to the vet, he learned that his cat gained 450 grams and his dog gained 120 grams. How much do his two pets weigh in all now?



Rania is measuring two ant lines. Colony A's ant line is 30 centimeters long, and Colony B's ant line is 500 millimeters long. How many centimeters long are the two ant lines together?



Amany is a swimmer. She spends half an hour every day swimming. How many minutes in total does she swim for during a 5-day period?



Sara travelled 9 days continuously. She travelled 5,000 meters each day. How many kilometers did she walk in all?



Ants walk about 5,000 meters each day. How many kilometers do ants walk in 6 days?



Samira is studying for an upcoming math test. If she studies for 30 minutes a day, how many hours will she have spent studying in 8 days?



A colony of ants eats approximately 2,000 grams of food each day. If the ants have 10 kilograms of food stored, how many days will the food last?



An ant may walk up to 5 km per day. If the ant continues this for 20 days, how many meters will the ant walk?



MATHEMATICAL PRACTICE

Look for a Pattern **Algebra** Complete.

Liters	Milliliters
1	1,000
2	
3	
	4,000
5	
6	
	7,000
8	
9	
10	

Kilograms	Grams
1	1,000
2	
	3,000
4	
5	
6	
7	
	8,000
9	
10	



Complete.

8 kilograms = _____ grams

7 liters = _____ milliliters



MATHEMATICAL PRACTICE

Use Symbols **Algebra** Compare using $<$, $>$, or $=$.

1 kilogram ○ 900 grams

2 liters ○ 2,000 milliliters



17. **WRITE** Math Jill has two rocks. One has a mass of 20 grams and the other has a mass of 20 kilograms. Which rock has the greater mass? Explain.

18. **THINK SMARTER** For numbers 18a–18c, choose Yes or No to tell whether the measurements are equivalent.

18a. 5,000 grams and 5 kilograms Yes No

18b. 300 milliliters and 3 liters Yes No

18c. 8 grams and 8,000 kilograms Yes No



UNIT

4

Theme 1 | Number Sense and Operations

Unit 4

Area and Perimeter

Photo Credit: i2.hinenet.com/123RF.com



Concept (1): Explore Area and Perimeter

Rectangle Review Compare the shapes in the boxes. Highlight or circle all of the rectangles and place a star on the squares.

545 cm

303 cm

545 cm

303 cm

17 cm

4 cm

17 cm

4 cm

30 mm

30 mm

30 mm

9 cm

9 cm

9 cm

9 cm

8 m

8 m

8 m

8 m

13 cm

25 cm

25 cm

20 cm

45 mm

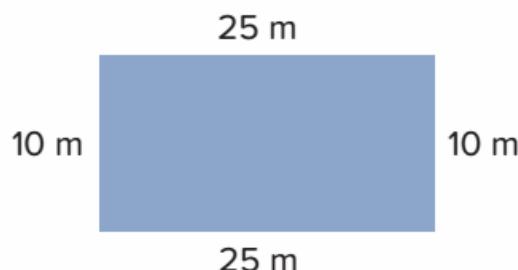
23 mm

23 mm

45 mm



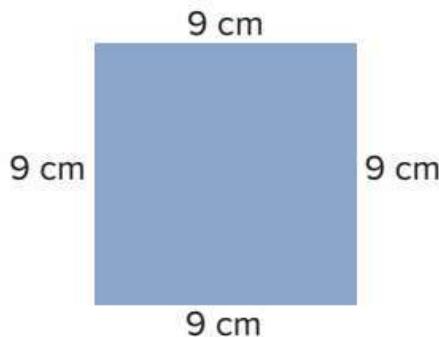
A group of worker ants are in search of food. They secrete pheromones (chemicals) to lay a scent trail. They follow each other in a line around a building. Using the model that follows, what is the perimeter of the building?



Use the $P = l + w + l + w$ formula to calculate the perimeter of the shapes. Show your work.

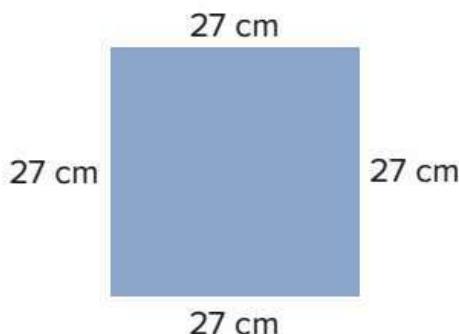


Use the $P = l + w + l + w$ formula to calculate the perimeter of the shapes. Show your work.



Foraging for Formulas Calculate the perimeter of the shapes that follow. Use two different formulas to solve each problem. Show your work.

1.



Formula 1: _____

Formula 2: _____



2.

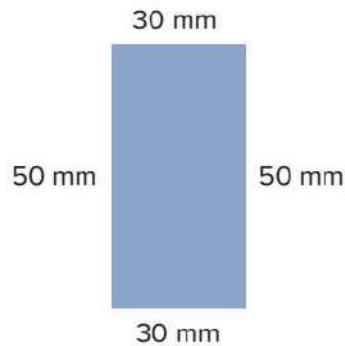


Formula 1: _____

Formula 2: _____



3.



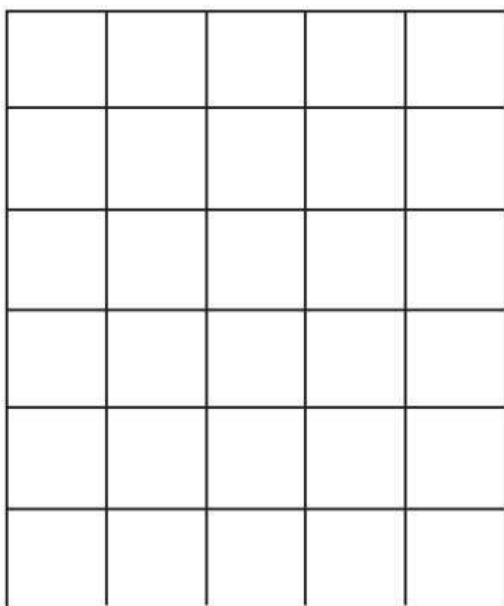
Formula 1: _____

Formula 2: _____



Area Review Determine the area of the rectangles. Show your work.

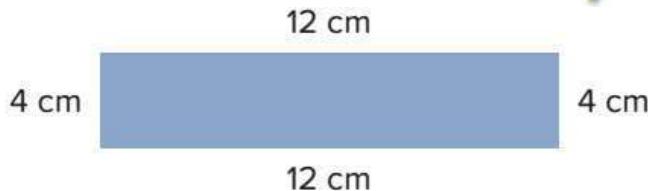
1.



Area = _____



2.

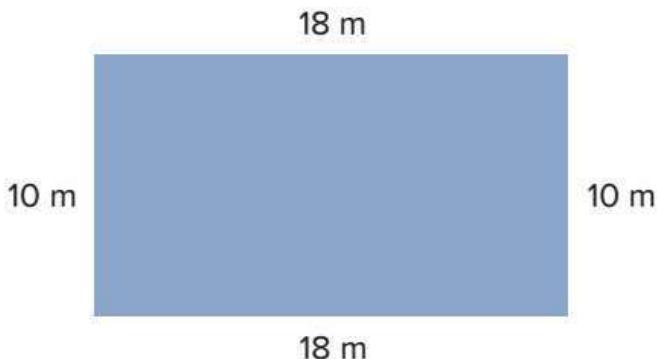


Area = _____

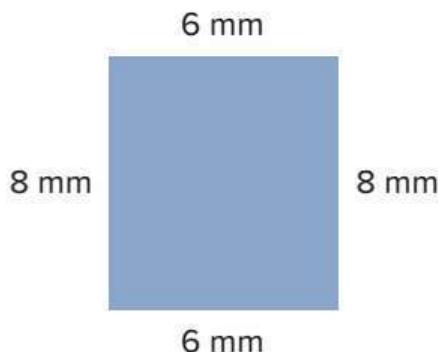


Area Practice Solve the problems. Show your work and label your answers.

1. Find the area.



2. Find the area.



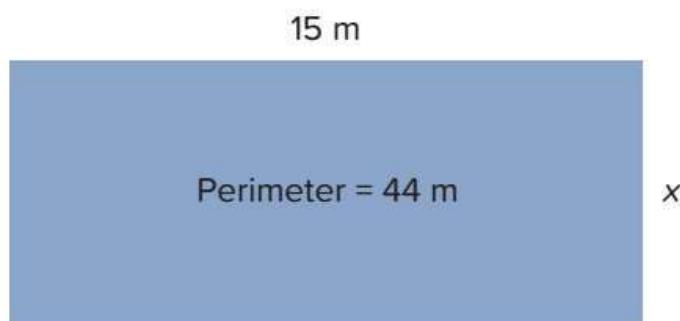
For a science project, two students are creating an ant farm enclosure. Their enclosure will be 5 meters long and 2 meters wide. Sketch the enclosure and label the dimensions. Then, find the perimeter and area.



The area of a rectangular bakery is 30 square meters. What could the perimeter be? Sketch your answer and label the dimensions.



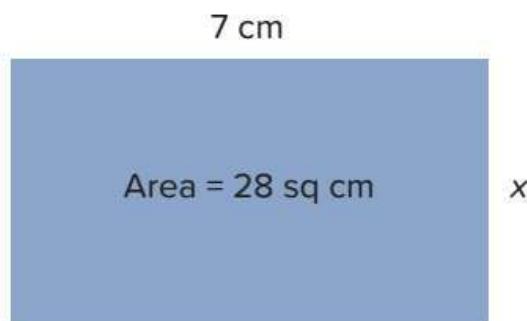
Find the unknown side length based on the perimeter given.



$$x = \underline{\hspace{2cm}}$$



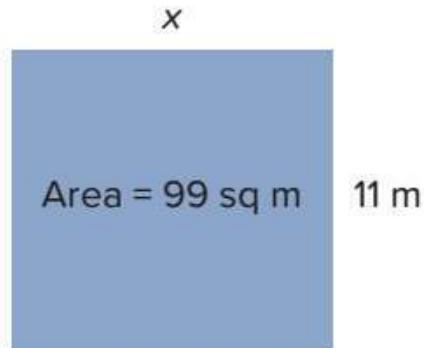
Find the unknown side length based on the area given.



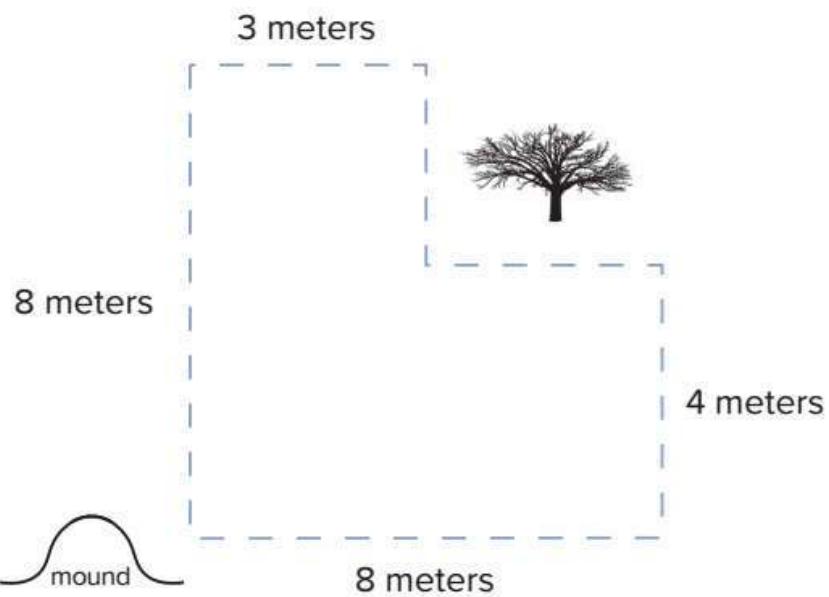
$$x = \underline{\hspace{2cm}}$$



Find the unknown side length based on the area given.



$$x = \underline{\hspace{2cm}}$$



$$\text{Perimeter} = \underline{\hspace{2cm}}$$

$$\text{Area} = \underline{\hspace{2cm}}$$



Calculating Crazy Shapes Solve each problem.

1. Divide this shape into smaller rectangles or squares. Then, calculate its area and perimeter. Show your work.

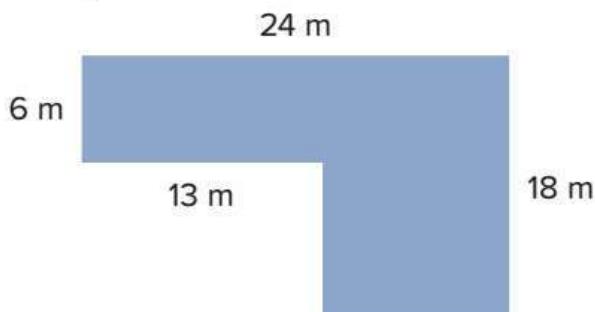


Area = _____

Perimeter = _____



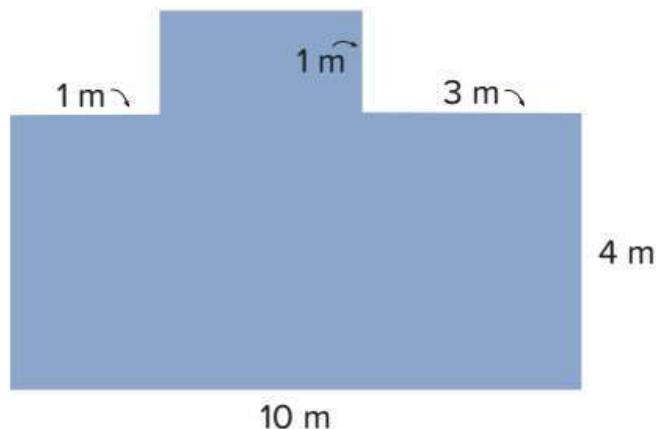
2. Divide the shape in a different way and calculate its area and perimeter. Show your work.



Area = _____

Perimeter = _____





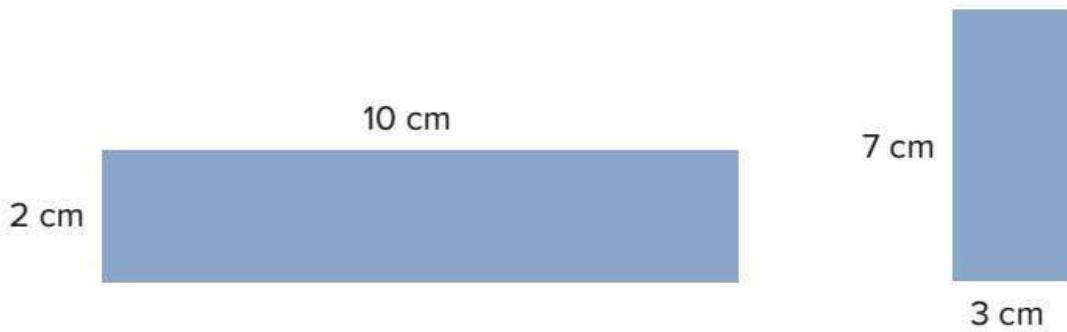
Area = _____

Perimeter = _____

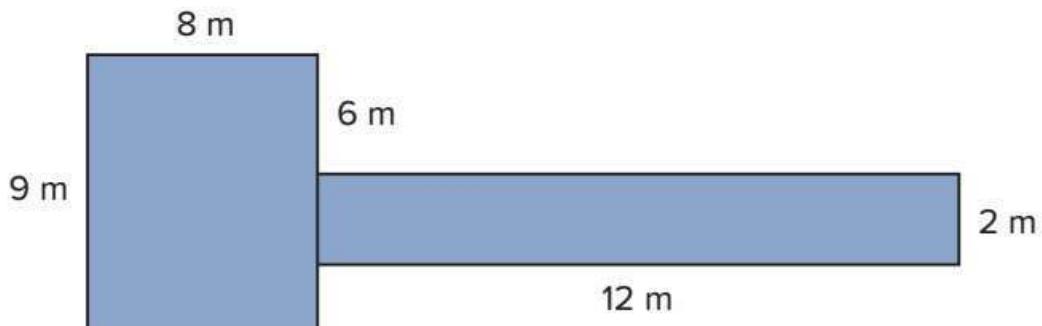


Combine these two simple shapes into a complex shape.

Sketch your shape, labeling the sides. Then, calculate the area and perimeter of the complex shape.



Calculate the area and perimeter.

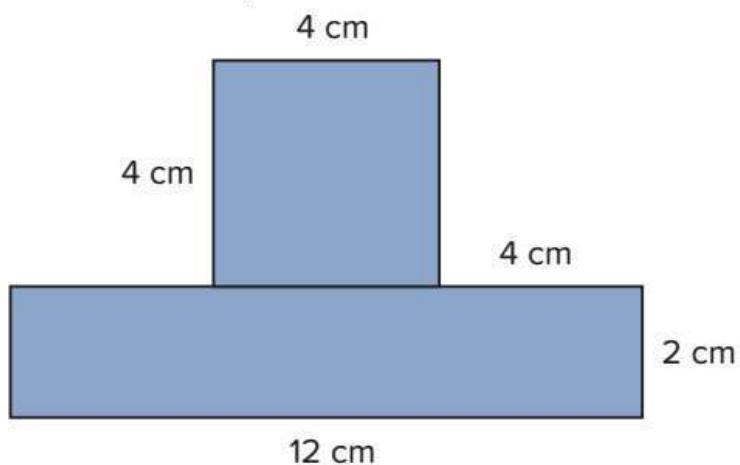


Area = _____

Perimeter = _____



Calculate the area and perimeter.



Area = _____

Perimeter = _____



The summary

	Rectangle	Square
Area	$A = L \times W$	$A = L \times L$
Perimeter	$P = (L + W) \times 2$	$P = L \times 4$

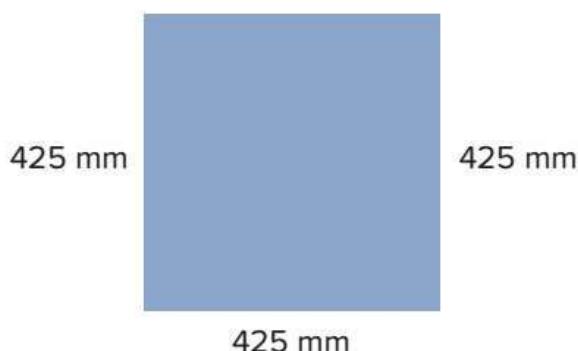


Homework

Find the perimeter. Show your work.

1.

425 mm



2.

57 m



3. Sherif is building a square picture frame. Each side will be 36 millimeters long. What will the perimeter of the frame be?



4. Omar is building a rectangular fence around his garden. The length is 8 meters and the width is 6 meters. How many meters of fencing will he need to build?



Find the area and perimeter of the rectangles. Show your work and label your answers.

1. 2 cm



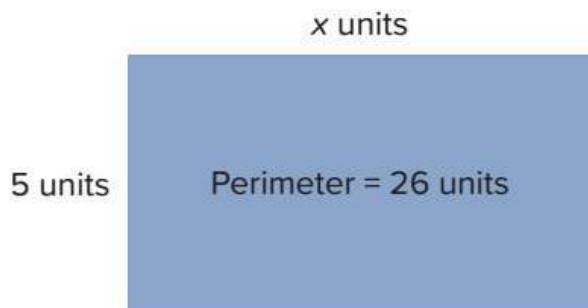
2. 97 mm



97 mm



Mystery Dimension Work with a partner to answer the questions about the rectangles.



1. What is known about this rectangle?

2. What is unknown about this rectangle?



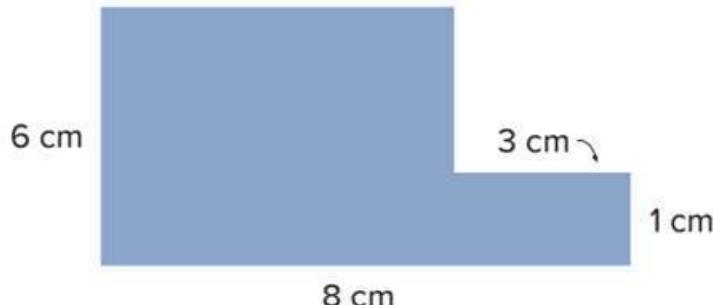
10 units

Area = 50 square units

x units

What is known about this rectangle?

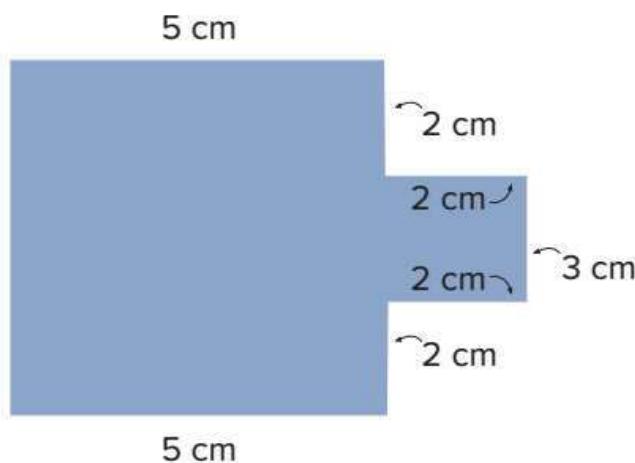
What is unknown about this rectangle?



Area = _____

Perimeter = _____



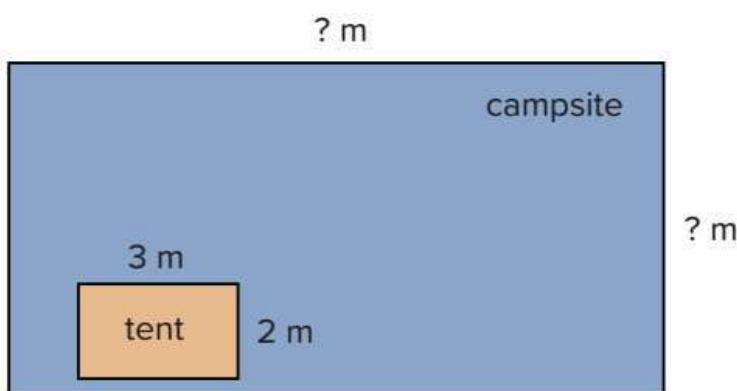


Area = _____

Perimeter = _____



Rami and Salah went on a camping trip. The diagram of their campsite is shown. If the length of the campsite is six times the length of the tent and the width of the campsite is three times the width of the tent, how much room will they have left to set up the rest of their camping gear?



Choose the correct answer:

1 The perimeter of a square =
 A) $L \times L$ B) $L \times 4$ C) $L \times W$ D) $(L+W) \times 2$

2 The area of a square =
 A) $L \times L$ B) $L \times 4$ C) $L \times W$ D) $(L+W) \times 2$

3 The perimeter of a rectangle =
 A) $L \times L$ B) $L \times 4$ C) $L \times W$ D) $(L+W) \times 2$

4 The area of a rectangle =
 A) $L \times L$ B) $L \times 4$ C) $L \times W$ D) $(L+W) \times 2$

5 The perimeter of a square of side length is 3 cm = cm
 A) 12 B) 20 C) 16 D) 28

6 The perimeter of a square of side length is 5 cm = cm
 A) 12 B) 20 C) 16 D) 28

7 The perimeter of a square of side length is 4 cm = cm
 A) 12 B) 20 C) 16 D) 28

8 The perimeter of a square of side length is 7 cm = cm
 A) 12 B) 20 C) 16 D) 28

9 The area of a square of side length is 3 cm =
 A) 9 cm B) 9 cm^2 C) 12 cm^2 D) 12 cm

10 The area of a square of side length is 4 cm = cm^2
 A) 8 B) 16 C) 36 D) 81

11 The area of a square of side length is 5 cm =
 A) 25 cm B) 25 cm^2 C) 20 cm^2 D) 20 cm

12 The area of a square of side length is 6 cm = cm^2
 A) 36 B) 24 C) 60 D) 12

13 The side length of a square of perimeter is 24 cm = cm
 A) 9 B) 4 C) 5 D) 6

14 The side length of a square of perimeter is 36 cm = cm
 A) 9 B) 4 C) 5 D) 7





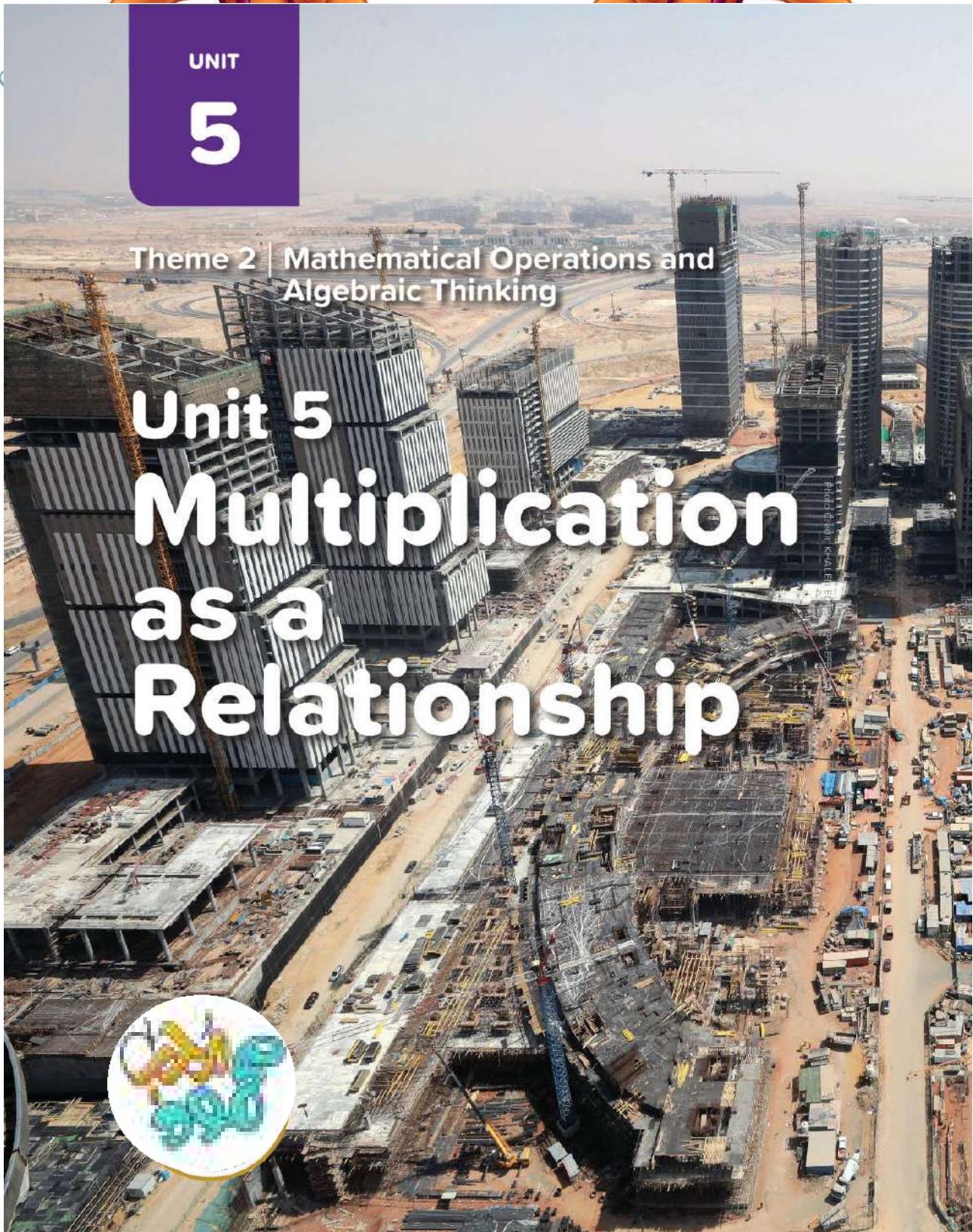
UNIT

5

Theme 2 | Mathematical Operations and
Algebraic Thinking

Unit 5

Multiplication as a Relationship



Concept (1): Multiplicative Comparisons

1. Compare 10 and 2. 10 is _____ times greater than 2.
2. Compare 12 and 3. 12 is _____ times greater than 3.
3. Compare 18 and 6. 18 is _____ times greater than 6.



Which statement is an example of a multiplicative comparison?

- A. A camel is 3 meters in length. A crocodile is 2 meters longer than a camel.
- B. A camel can weigh up to 1,000 kilograms. This is twice as much as a crocodile weighs.
- C. Crocodiles have 64 teeth. Camels have 32 fewer teeth than crocodiles.
- D. There are about 30,000 crocodiles in Egypt. There are about 60,000 more camels in Egypt.



Rewrite each equation using multiplication.

1. $6 + 6 + 6 = 18$ _____

2. $2 + 2 + 2 + 2 + 2 + 2 + 2 = 14$ _____



Fill in the blanks to complete the multiplicative comparison statement for each tape diagram.

3.	5	5	5	5
----	---	---	---	---

_____ is _____ times greater than 5.

4.	8	8	8
----	---	---	---

_____ is _____ times greater than 8.



A building is 20 meters tall. A bridge is 5 meters tall. The building is how many times taller than the bridge?

- A. 3
- B. 4
- C. 15
- D. 100



Akil is twice as old as his brother. His brother is 8 years old. Which two equations can be used to find Akil's age?

- A. $2 + a = 8$
- B. $2 \times a = 8$
- C. $2 \times 8 = a$
- D. $8 + 2 = a$
- E. $8 + 8 = a$



Multiplying to Show Comparisons Write an equation based on the comparison statement. Use a letter to represent the unknown number. You do not have to solve the equations.

1. 4 times greater than 3 is _____
2. 18 is 6 times as many as _____
3. 2 times greater than 7 is _____
4. 24 is 4 times as great as _____
5. 25 is 5 times as many as _____



How Many Seats? Use the information in the table to compare numbers of seats in different modes of transportation. Then, enter and solve an equation for each comparison.

Mode of Transportation	Number of Seats
Bicycle	1
Motorbike	2
Car	4
Truck	6
Bus	36
Metro Train	48

1. How many times as many seats are in a truck than on a motorbike?

Equation: _____

Answer: _____



2. How many times as many seats are on a bus than in a truck?

Equation: _____

Answer: _____

3. How many times as many seats are on the metro train than in a car?

Equation: _____

Answer: _____

4. A metro train can fit how many times more people than a truck?

Equation: _____

Answer: _____

5. A bus has how many times more seats than a car?

Equation: _____

Answer: _____



Homework

1. Compare 15 and 3. 15 is _____ times greater than 3.
2. Compare 28 and 7. 28 is _____ times greater than 7.
3. Compare 27 and 9. 27 is _____ times greater than 9.



Khepri and her sister peeled oranges. Khepri peeled 6 oranges. Khepri's sister peeled 3 times as many oranges as Khepri. Which equation can be solved to find the number of oranges that Khepri's sister peeled?

- A. $6 + 3 = n$
- B. $6 \times 3 = n$
- C. $n + 3 = 6$
- D. $n \times 3 = 6$



A fish tank has 3 red fish and 17 times as many blue fish. How many blue fish are in the tank?

- A. 20
- B. 31
- C. 17
- D. 51



Write an equation for each of the following comparisons, and then solve.

1. What number is 5 times greater than 6?

2. 36 is 4 times more than what number?

3. Ayman ate 4 figs in the morning. His older brother ate 3 times as many. How many figs did his brother eat?



Concept (2)

Properties and Patterns of Multiplication



Arrays and the Commutative Property

Array Equation 1: 2 x 4 = _____ x _____

Array Equation 2: 3 x 7 = _____ x _____

Array Equation 3: 5 x 9 = _____ x _____

Array Equation 4: 6 x 8 = _____ x _____

Array Equation 5: 1 x 3 = _____ x _____



Apply the Commutative Property of Multiplication to complete each equation.

1. $5 \times 7 = \underline{\hspace{2cm}} \times 5$

2. $20 \times \underline{\hspace{2cm}} = 6 \times 20$



Which equation would be best to include in an explanation of the Commutative Property of Multiplication?

- A. $3 \times 5 = 5 \times 3$
- B. $4 \times 16 = (4 \times 11) + (4 \times 5)$
- C. $(6 \times 4) \times 2 = 6 \times (4 \times 2)$
- D. $5 \times 1 = 5$



Which number is the result of multiplying a single-digit number by 10?

- A. 14
- B. 80
- C. 400
- D. 810

Products

$1 \times 10 = 10$
$5 \times 10 = 50$
$9 \times 10 = 90$
$13 \times 10 = 130$
$17 \times 10 = 170$
$21 \times 10 = 210$



Mental Math Number Talk Look at the problems below. Solve them mentally (without writing anything down).

1. 5×1
2. 12×1
3. 672×1
4. 8×0
5. 16×0
6. 758×0



Which equation shows how to apply the Associative Property of Multiplication to determine the value of $3 \times (2 \times 10)$?

- A. $5 \times 10 = 50$
- B. $6 \times 10 = 60$
- C. $3 \times 20 = 320$
- D. $3 \times 12 = 36$



Follow your teacher's directions to solve the practice problems.

What is the value of each of the following:

1. $100 \times 5 =$ _____

2. _____ $= 1,000 \times 2$

3. $700 = 7 \times$ _____

4. $9 \times$ _____ $= 9,000$

5. Challenge: $4 \times 10,000 =$ _____



Use your die to complete the first space then find the answer:

1. $3,000 \times$ _____ $=$ _____

2. _____ 00 $\times 8 =$ _____

3. _____ $\times 500 =$ _____

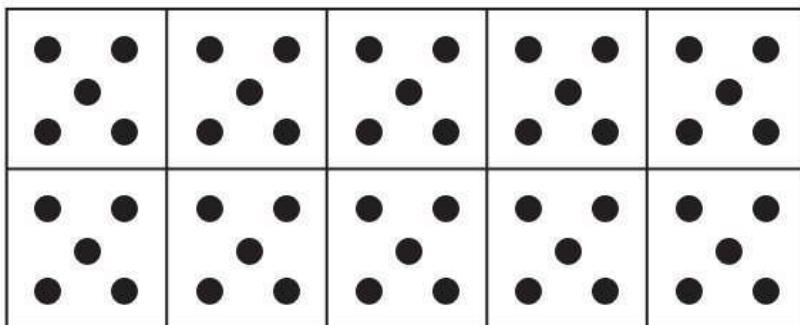
4. $9 \times$ _____ 0 $=$ _____

5. $6,000 \times$ _____ $=$ _____

6. _____ 00 $\times 5 =$ _____



Dot Card Number Talk Look at the image. How many dots do you see in the image below? How did you come up with your answer?



Uncovering the Associative Property of Multiplication Solve the problem assigned by your teacher.

Problem 1: $3 \times 2 \times 4 =$ _____

Problem 2: $4 \times 2 \times 3 =$ _____



Applying the Associative Property of Multiplication Work with a partner to solve the problems. Place parentheses around the factors that you will multiply first. Rewrite the factors in another order if helpful.

1. $3 \times 2 \times 5 =$ _____

2. $4 \times 6 \times 2 =$ _____

3. $2 \times 9 \times 3 =$ _____

4. $3 \times 2 \times 3 =$ _____



Solve each problem. Multiply the part in the parentheses first.

Show your work.

1. $(2 \times 3) \times 4 =$ _____

2. $(5 \times 2) \times 3 =$ _____

3. $2 \times (3 \times 4) =$ _____

4. $5 \times (2 \times 3) =$ _____



Write how many Tens make up each number.

7. $30 =$ _____ Tens

8. $80 =$ _____ Tens

9. $160 =$ _____ Tens

10. $140 =$ _____ Tens

11. $120 =$ _____ Tens

12. $110 =$ _____ Tens



Decompose each multiple of 10, 100, or 1,000 before multiplying.

Draw parentheses around the numbers you would multiply first, and then write the answer.

1. $5 \times 70 =$ _____

2. $8 \times 30 =$ _____

3. $4 \times 40 =$ _____

Solve using a strategy you prefer.

4. $6 \times 90 =$ _____



Homework

Apply the Commutative Property of Multiplication to find the unknown value.

3. $33 \times 4 = 4 \times a$ _____

4. $b \times 9 = 9 \times 8$ _____



Products
$2 \times 100 = 200$
$8 \times 100 = 800$
$14 \times 100 = 1,400$
$20 \times 100 = 2,000$

Which statement *best* describes how to find the product when a number is multiplied by 100?

- A. Add one zero to the left of the number.
- B. Add one zero to the right of the number.
- C. Add two zeros to the right of the number.
- D. Add two zeros to the left of the number.



Products
$6 \times 1,000 = \Delta$
$9 \times 1,000 = 9,000$
$17 \times 1,000 = 17,000$
$30 \times 1,000 = 30,000$

Based on the pattern in the table, the Δ in the first equation should be replaced by _____.



Which equation would be best to include in an explanation of the Associative Property of Multiplication?

- A. $(9 \times 12) \times 0 = 0$
- B. $(4 \times 6) \times 1 = 4 \times 6$
- C. $(3 \times 7) \times 2 = 3 \times (7 \times 2)$
- D. $(11 \times 8) \times 9 = 9 \times (11 \times 8)$



Which One Does Not Belong? Look at the problems. Which problem does not belong in the group? Why do you think so? Be prepared to share your thinking.

1. $6 \times 100 = 600$	3. $500 \times 3 = 1,500$
2. $9 \times 100 = 900$	4. $8,000 = 8 \times 1,000$



Apply the strategies you have learned to solve the problems.

1. $900 \times 3 =$ _____	4. $600 \times 3 = 3 \times$ _____
2. $4 \times 40 =$ _____	5. $500 \times$ _____ $= 3,500$
3. $8,000 \times 5 =$ _____	



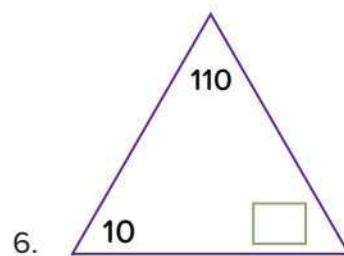
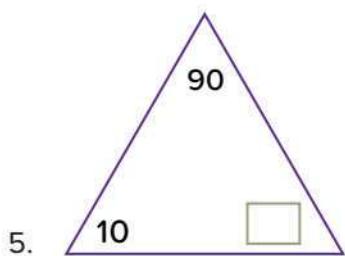
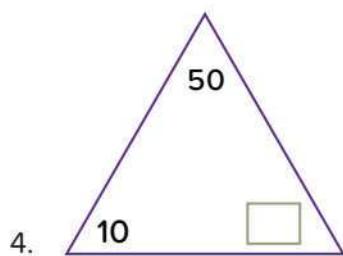
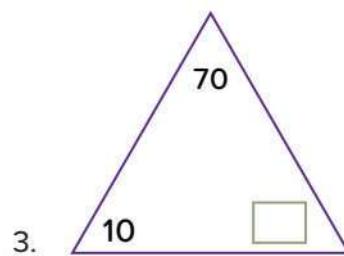
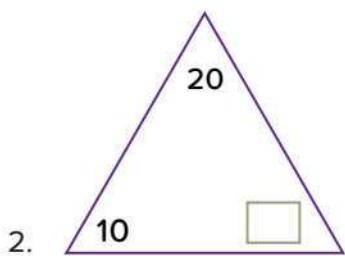
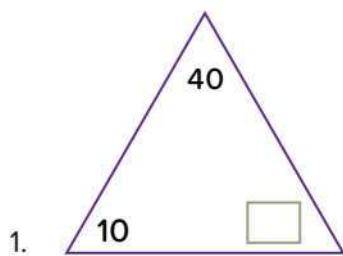
Place parentheses to show one way to find the product. Then, show one other way to use parentheses to find the product.

5. $5 \times 4 \times 2$

6. $3 \times 6 \times 2$



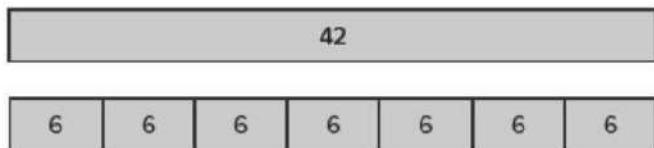
Decomposing Multiples of 10 Decompose each number into a factor pair with 10. Write the missing factor in the box.



Choose the *best* numbers to complete the equation.

6	7	36	42
---	---	----	----

A model is shown.



Which equation is best represented by this model?

$$6 \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$



Khalid used the Associative Property to rewrite and correctly evaluate this expression: $6,000 \times 7$.

Which equation was *most likely* part of Khalid's work?

- A. $1,000 \times 13 = 1,300$
- B. $1,000 \times 42 = 4,200$
- C. $1,000 \times 13 = 13,000$
- D. $1,000 \times 42 = 42,000$





UNIT

6

Theme 2 | Mathematical Operations and Algebraic Thinking

Unit 6

Factors and Multiples



Concept (1): Understanding Factors

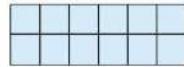
1. Use the arrays to name the factors of 12.



$$\underline{\quad} \times \underline{\quad} = 12$$



$$\underline{\quad} \times \underline{\quad} = 12$$



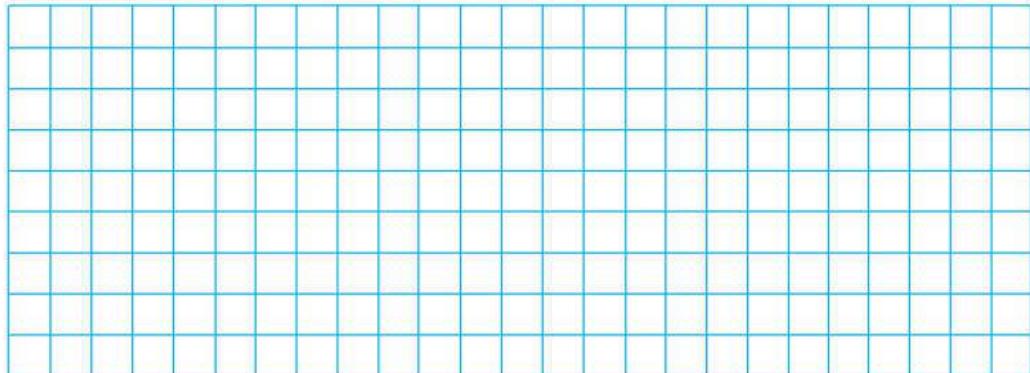
$$\underline{\quad} \times \underline{\quad} = 12$$

The factors of 12 are 1, , 3, , 6, and .

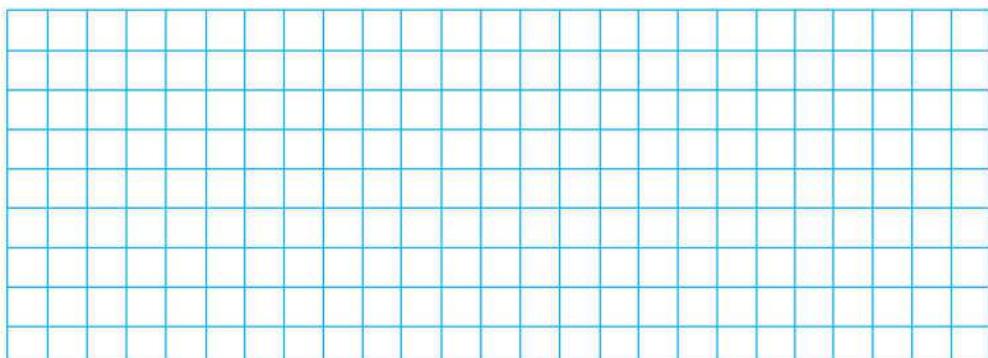


Use tiles to find all the factors of the product. Record the arrays and write the factors shown.

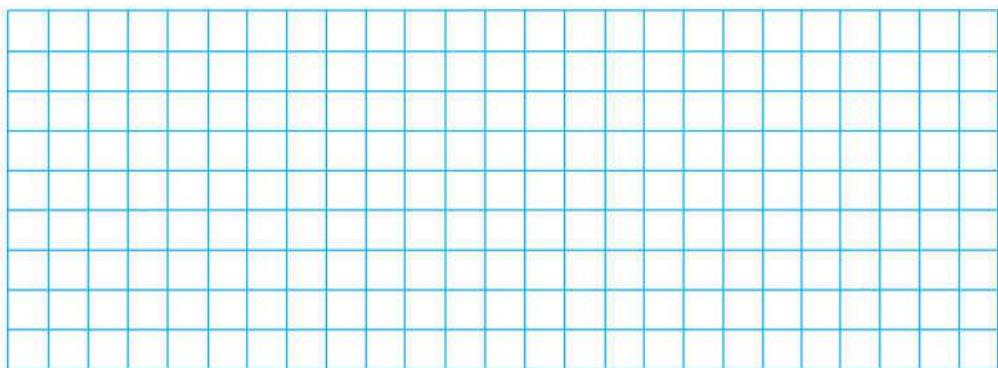
2. 5:



3. 20:



4. 25: _____



Count by 2s. Shade the numbers that you say as you count.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Count by 5s. Shade the numbers that you say as you count.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Count by 10s. Shade the numbers that you say as you count.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



Determine if the given number has 2 as a factor, 5 as a factor, or 10 as a factor. Circle yes or no.

	Number	Is 2 a factor?		Is 5 a factor?		Is 10 a factor?	
1	26	Yes	No	Yes	No	Yes	No
2	70	Yes	No	Yes	No	Yes	No
3	15	Yes	No	Yes	No	Yes	No
4	17	Yes	No	Yes	No	Yes	No



THINK SMARTER

Sarah was organizing vocabulary words using index cards. She arranged 40 index cards in the shape of a rectangle on a poster. For 14a–14e, choose Yes or No to tell whether a possible arrangement of cards is shown.

14a. 4 rows of 10 cards

 Yes No

14d. 40 rows of 1 card

 Yes No

14b. 6 rows of 8 cards

 Yes No

14e. 35 rows of 5 cards

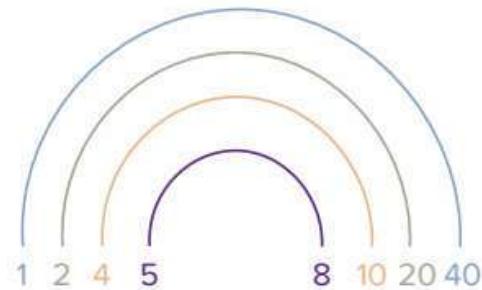
 Yes No

14c. 20 rows of 2 cards

 Yes No

Show students how to create a T-chart using the factors of 40.

	40
2	20
4	10
5	8



Finding Factor Pairs Work with your teacher to create a factor rainbow and T-chart for 40.

1. List the factors of 40.

Factor Rainbow

T-Chart



2. List the factors of 36. There are 5 factor pairs.

Factor Rainbow

T-Chart



3. List the factors of 20. There are 3 factor pairs.

Factor Rainbow

T-Chart



Prime Numbers:

- The prime number is a whole number that **has only 2 factors**.
- The prime number is **divisible only by 1 and itself**.
- 2 is the **smallest** prime number.
- 3 is the **smallest odd** prime number.
- 2 is the **only even** prime number.
- All prime numbers are odd except 2

Prime Numbers less than 100:

2	3	5	7
11	13	17	19
23		29	
31		37	
41	43	47	
53	59		
61	67		
71	73	79	
83	89		
97			



The Greatest Common Factor (GCF)

A class is going on a field trip. There are 36 girls and 27 boys in the class. Students will be divided into groups of girls and groups of boys. What is the greatest number of groups that can be made so that each group has the same number of children? How many children will be in each group of boys? How many children will be in each group of girls?



Find the greatest common factor (GCF) of the given numbers.

4. 40 and 48

5. 12 and 18

6. 10 and 45



Homework

Highlight or circle the factors of the numbers listed.

1. 15: 2 5 10
2. 30: 2 5 10
3. 12: 2 5 10
4. 25: 2 5 10
5. 36: 2 5 10



List all of the factors of each number. You may create a factor tree, factor rainbow, or factor T-chart.

6. 25:
7. 19:
8. 48:
9. 16:



Is 9 a factor of the number? Write yes or no.

6. 54

7. 63

8. 67

9. 93



Color the prime numbers in red:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	15	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



List all the factors of each number. Then, write if the number is prime or composite.

1. 14

4. 59

2. 46

5. 50

3. 22

6. 29



Choose the best words or numbers to complete each statement.

correct	1, 2, 3, 6	1, 2, 3, 6	3
incorrect	1, 2, 3, 6, 9, 18	1, 2, 3, 6, 9, 18	6

1, 2, 3, 4, 6, 8, 12, 24
1, 2, 3, 4, 6, 8, 12, 24

Femi said the greatest common factor of 18 and 24 was 12.

Femi was _____ because the factors of 18 are

_____ and the factors of 24 are

_____. The greatest common factor of

18 and 24 is _____.



Concept (2): Understanding Multiples

The product of two numbers is a multiple of each number. Factors and multiples are related.

$$3 \times 4 = 12$$

↑ ↑ ↑
 factor factor multiple of 3
 multiple of 4



Is the number a multiple of 6? Write yes or no.

6. 3

7. 6

8. 16

9. 18



Is the number a multiple of 3? Write yes or no.

10. 4

11. 8

12. 24

13. 38



MATHEMATICAL PRACTICE 8 Generalize Algebra Find the unknown number.

15. 12, 24, 36, _____

16. 25, 50, 75, 100, _____



14. List the next nine multiples of each number. Find the common multiples.

Multiples of 2: 2, _____

Multiples of 8: 8, _____

Common multiples: _____

PRACTICE

1. Find a common multiple of 4 and 8:

2. Find a common multiple of 7 and 3:

3. Find two common multiples of 2 and 6:

4. Find two common multiples of 4 and 6

5. Which is a common multiple of 5 and 8: 20, 40, 35

6. Which is NOT a common multiple of 9 and 6: 18, 27, 36



Think about the relationships between the numbers in each group.

Write at least two sentences describing what you notice.

1. 3, 6, and 12

2. 4, 8, 16, and 24

3. How are factors and multiples related?

Which list of numbers are all common multiples of 3 and 7?

- A. 1, 3, 7
- B. 21, 42, 63
- C. 21, 28, 35
- D. 15, 21, 27



Is 27 a multiple of 9?

- A. yes, because factors of 27 are 3 and 9
- B. no, because factors of 9 are 1 and 9
- C. no, because multiples of 27 are 9 and 243
- D. yes, because multiples of 27 are 9 and 3



Bes thinks 12 is a factor of 36. Is he correct?

- A. no, because 36 is not a factor of 12
- B. yes, because 12 is not a multiple of 36
- C. no, because 12 and 36 are evenly divisible by 2
- D. yes, because 12 can be evenly multiplied to equal 36



THINK SMARTER

For numbers 29a–29e, select True or False for each statement.

29a. The number 45 is a multiple of 9.	<input type="radio"/> True	<input type="radio"/> False
29b. The number 4 is a multiple of 16.	<input type="radio"/> True	<input type="radio"/> False
29c. The number 28 is a multiple of 4.	<input type="radio"/> True	<input type="radio"/> False
29d. The number 4 is a factor of 28.	<input type="radio"/> True	<input type="radio"/> False
29e. The number 32 is a factor of 8.	<input type="radio"/> True	<input type="radio"/> False

Homework

Choose the correct answer:

1 Number of factors of 3 is
 A) 2 B) 3 C) 4 D) 5

2 Number of factors of 8 is
 A) 2 B) 3 C) 4 D) 5

3 Number of factors of 9 is
 A) 2 B) 3 C) 4 D) 5

4 The number 12 has factors
 A) 3 B) 4 C) 5 D) 6

5 3 is a factor of
 A) 35 B) 20 C) 27 D) 31

6 3 is a factor of
 A) 18 B) 20 C) 25 D) 31

7 is a factor of 6
 A) 2 B) 5 C) 7 D) 9

8 is a factor of 12
 A) 5 B) 3 C) 9 D) 10

9 The number that is divisible by 2 is called
 A) Odd B) Even C) Prime D) Otherwise

10 The number that has only two factors is
 A) 2 B) 10 C) 6 D) 9

11 The smallest even prime number is
 A) 0 B) 1 C) 2 D) 3

12 Is a prime number.
 A) 4 B) 6 C) 8 D) 7

13 Is a prime number.
 A) 11 B) 6 C) 8 D) 10



14 From the prime numbers
 A) 31 B) 10 C) 12 D) 16

15 Is a prime factor of 10
 A) 1 B) 6 C) 5 D) 10

16 Is a prime number between 30 and 40 is
 A) 33 B) 35 C) 37 D) 39

17 Is a prime number between 32 and 40 is
 A) 33 B) 35 C) 37 D) 39

18 The number whose prime factors are 2 , 2 , 2 and 3 is
 A) 20 B) 22 C) 24 D) 28

19 Number of factors of 4 is
 A) 2 B) 3 C) 4 D) 5

20 Number of factors of 11 is
 A) 2 B) 3 C) 4 D) 5

21 The number 18 has factors
 A) 3 B) 4 C) 5 D) 6

22 5 is a factor of
 A) 25 B) 8 C) 16 D) 24

23 is a factor of 6
 A) 10 B) 1 C) 7 D) 9

24 is a factor of 12
 A) 5 B) 7 C) 4 D) 10

25 The number that has only two factors is
 A) 12 B) 7 C) 6 D) 9

26 The only even prime number is
 A) 0 B) 1 C) 2 D) 3



For numbers 12a-12e, select True or False for each statement.

12a. The number 36 is a multiple of 9. True False

12b. The number 3 is a multiple of 9. True False

12c. The number 54 is a multiple of 9. True False

12d. The number 3 is a factor of 9. True False

12e. The number 27 is a factor of 9. True False





UNIT

7

Theme 2 | Mathematical Operations and
Algebraic Thinking

Unit 7

Multiplication and Division: Computation and Relationships



Concept (1)

Multiplying by 1-Digit and 2-Digit Factors



River Boat on the Nile

Twenty-two passengers can fit on each river bus at a time. What is the maximum number of passengers the river bus can carry if it makes 5 trips?

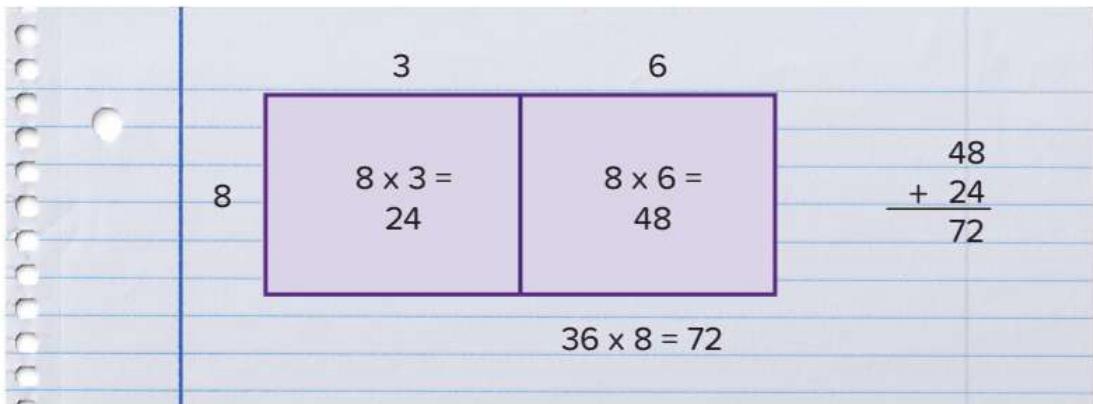


Decomposing Numbers Fill in the missing number for each decomposition.

1. $536 = 500 + \underline{\hspace{2cm}} + 6$
2. $1,275 = \underline{\hspace{2cm}} + 200 + 70 + 5$
3. $264 = 60 + 4 + \underline{\hspace{2cm}}$
4. $7,625 = 5 + 7,000 + 20 + \underline{\hspace{2cm}}$
5. $357 = 50 + \underline{\hspace{2cm}} + 7$



A student solved the problem 36×8 in the following way:



Is that true? Why?



The Distributive Property and Area Models Use the area model to solve each problem.

1. 249×5

2. $4,734 \times 5$

3. 530×7

4. $2,391 \times 8$



Partial Product

Example:

$$\begin{array}{r}
 731 \\
 \times \quad 4 \\
 \hline
 2,800 \text{ (700} \times 4\text{)} \\
 120 \text{ (30} \times 4\text{)} \\
 + \quad 4 \text{ (1} \times 4\text{)} \\
 \hline
 2,924
 \end{array}$$

$$\begin{array}{r}
 239 \\
 \times \quad 7 \\
 \hline
 1,400 \text{ (} \underline{\quad 7 \quad} \times \underline{\quad 200 \quad} \text{)} \\
 210 \text{ (} \underline{\quad 7 \quad} \times \underline{\quad 30 \quad} \text{)} \\
 + \quad 63 \text{ (} \underline{\quad 7 \quad} \times \underline{\quad 9 \quad} \text{)} \\
 \hline
 1,673
 \end{array}$$



Problem	Partial Products
7×59	
624×4	
$6 \times 3,293$	



$$\begin{array}{r} 6,421 \\ \times \quad 6 \\ \hline 36,000 \quad (\text{_____} \times \text{_____}) \\ \text{_____} \quad (6 \times 400) \\ 120 \quad (6 \times \text{_____}) \\ + \text{_____} \quad (6 \times 1) \\ \hline \end{array}$$



Solve using the partial products algorithm.

1. $4,731 \times 4 =$



2. $29 \times 4 =$



Similarities in Models Estimate the products of the two problems.

Then, solve using the method assigned by your teacher.

1. 64×7

Estimate:

Solved Answer:

2. 132×8

Estimate:

Solved Answer:



3. 32
 $\times 3$

Estimate:

$30 \times 3 = 90$

Answer:

$32 \times 3 = 96$

4. 17
 $\times 6$

Estimate:

$20 \times 6 = 120$

Answer:

$17 \times 6 = 102$



5. 134
 $\times 2$

Estimate:

Answer:

6. 758
 $\times 3$

Estimate:

Answer:



Ten Times Predict what you think will happen when you multiply two multiples of 10 together.

$$30 \times 5 = 150$$

$$30 \times 50 = \underline{\hspace{2cm}}$$

$$2 \times 80 = 160$$

$$20 \times 80 = \underline{\hspace{2cm}}$$

$$70 \times 7 = 490$$

$$70 \times 70 = \underline{\hspace{2cm}}$$

$$50 \times 60 = \underline{\hspace{2cm}}$$

$$90 \times 70 = \underline{\hspace{2cm}}$$

$$40 \times 40 = \underline{\hspace{2cm}}$$

$$60 \times 30 = \underline{\hspace{2cm}}$$



A group of 38 people want to travel by bus.

Each bus ticket costs 30 LE.

How much do they need to pay in all?



Buses Parked at a Pyramid



Problem	Numbers and Symbols
1. 40×62	
2. 70×55	
3. 54×30	
4. 40×78	
5. 44×20	
6. 15×30	
7. 10×40	
8. 72×40	



Create area models to solve the problems.

1. $45 \times 28 = 1,260$

x	40	5
20	800	100
8	320	40

$$800 + 100 + 320 + 40 = 1,260$$



2. $81 \times 23 = 1,863$



4. There are 6 people who won 145 pounds each at the fair. How much money did they win all together?



19. **THINK SMARTER** Select the expressions that have the same product as 35×17 . Mark all that apply.

$(30 \times 10) + (30 \times 7) + (5 \times 10) + (5 \times 7)$ $(30 \times 17) + (5 \times 17)$
 $(35 \times 30) + (35 \times 5) + (35 \times 10) + (35 \times 7)$ $(35 \times 10) + (35 \times 7)$
 $(35 \times 10) + (30 \times 10) + (5 \times 10) + (5 \times 7)$ $(35 \times 30) + (35 \times 5)$

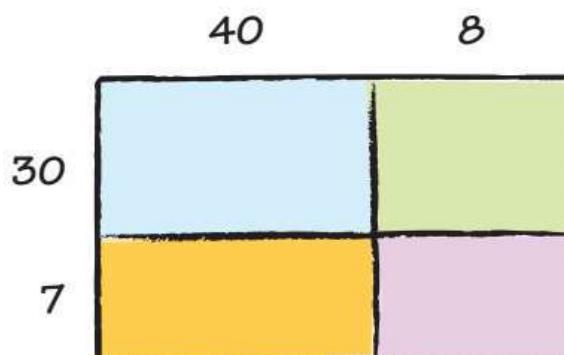


For numbers 3a–3e, select Yes or No to show if the answer is correct.

3a. $35 \times 10 = 350$ Yes No
 3b. $19 \times 20 = 380$ Yes No
 3c. $12 \times 100 = 120$ Yes No
 3d. $70 \times 100 = 7,000$ Yes No
 3e. $28 \times 30 = 2,100$ Yes No



The model shows 48×37 . Write the partial products.



Homework

Use numbers and symbols to solve each problem.

Problem	Numbers and Symbols
1. 32×7	
2. 5×483	
3. 7×723	
4. $1,673 \times 8$	



$$\begin{array}{r}
 2,523 \\
 \times \quad \quad 5 \\
 \hline
 10,000 \quad (\quad \quad \times \quad \quad \quad) \\
 \hline
 \quad \quad \quad (5 \times 500) \\
 100 \quad (5 \times \quad \quad \quad) \\
 + \quad \quad \quad (5 \times 3) \\
 \hline
 \quad \quad \quad
 \end{array}$$



3. $5 \times 343 =$



7. $1,349$

$$\begin{array}{r} \times \quad \quad 2 \end{array}$$

Estimate:

8. $2,327$

$$\begin{array}{r} \times \quad \quad 4 \end{array}$$

Estimate:

Answer:

Answer:



Solve using the standard algorithm.

1. $7 \times 30 =$ _____

2. $4 \times 800 =$ _____

3. $27 \times 3 =$ _____

4. $204 \times 2 =$ _____

5. $2,213 \times 4 =$ _____

6. $1,390 \times 2 =$ _____

7. $735 \times 5 =$ _____



Solve using the area model or the partial products algorithm. Use estimation to check the reasonableness of your answers.

1. $23 \times 40 =$ _____

2. $20 \times 54 =$ _____

3. $90 \times 32 =$ _____

4. $5 \times 13 =$ _____

5. $10 \times 56 =$ _____

6. $30 \times 78 =$ _____

3. $60 \times 12 = 720$



Which product is shown by the model? Write the letter of the product on the line below the model.

A 17×36

10	10	3
10	100	30
3	30	9

B 24×14

30	6
10	300
7	210

C 13×13

10	4
20	200
4	40

Select another way to show 25×18 . Mark all that apply.

- (20 \times 10) + (20 \times 8) + (5 \times 10) + (5 \times 8)
- (25 \times 20) + (25 \times 5) + (25 \times 10) + (25 \times 8)
- (20 \times 18) + (5 \times 10) + (5 \times 8)
- (25 \times 10) + (25 \times 8)
- (25 \times 20) + (25 \times 5)



Concept (2): Dividing by 2-Digit Divisors

Learning Targets

- I can identify the **dividend**, **divisor**, and **quotient** of a division problem.
- I can solve division problems.
- I can explain what a **remainder** represents in a division problem.



Division Patterns Label the parts in the equation using the words divisor, dividend, and quotient. Then, look for patterns to complete the remaining problems. The first problem in the table is an example that is filled in for you.

$600 \div 3 =$ Answer

600 is called the _____.

3 is called the _____.

The answer is called the _____.



There were 540 crayons in a large bin. Students were asked to put 9 crayons in a small box for each student to use. How many small boxes will students need in order to complete this task?



Equation	Related Fact	Quotient
$600 \div 3$	$6 \div 3 = 2$	200
$150 \div 5$		
$1,200 \div 6$		
$200 \div 4$		
$700 \div 7$		
$6,400 \div 8$		
$4,500 \div 9$		
$270 \div 3$		



Use Arrays to Divide Draw to complete each array.

Then complete the number sentence.

1.

2.

$8 \div 4 = \underline{\quad}$

$21 \div 3 = \underline{\quad}$



Partial Quotient Algorithm

Model Match Write the division problem that matches each area model. Remember to include the quotient and remainder, if there is one.

1. 6 

50 10 3



4

4,000

1,200

400

28

1,000

300

100

7

R3



Let's Try It Solve the problems using the standard algorithm.

1. $454 \div 3$

2. $778 \div 2$

3. $368 \div 3$

4. $4,858 \div 4$



Solve using the standard division algorithm. Show your work.

1. $240 \div 6 =$ _____

2. $1,500 \div 5 =$ _____

3. $414 \div 4 =$ _____

4. $761 \div 6 =$ _____



Yahia placed 21 paints equally on 3 tables. How many paints were placed on each table?



Use counters to find the quotient and remainder.

1. $10 \div 3$

2. $28 \div 5$

3. $15 \div 6$

4. $11 \div 3$

5. $29 \div 4$

6. $34 \div 5$

7. $25 \div 3$

8. $7 \overline{)20}$



Go Deeper Alyson has 46 beads to make bracelets. Each bracelet has 5 beads. How many more beads does Alyson need so that all the beads she has are used? Explain.

THINK SMARTER For 13a–13d, choose Yes or No to tell whether the division expression has a remainder.

13a. $36 \div 9$	<input type="radio"/> Yes	<input type="radio"/> No
13b. $25 \div 3$	<input type="radio"/> Yes	<input type="radio"/> No
13c. $82 \div 9$	<input type="radio"/> Yes	<input type="radio"/> No
13d. $28 \div 7$	<input type="radio"/> Yes	<input type="radio"/> No



Use basic facts and place value to find the quotient.

3. $360 \div 6 =$ _____

4. $2,000 \div 5 =$ _____

5. $4,500 \div 9 =$ _____



Homework

2. $3200 \div 8 =$ _____

3. $67 \div 3 =$ _____

4. $455 \div 4 =$ _____



Use basic facts and place value to find the quotient.

6. $560 \div 8 =$ _____

7. $200 \div 5 =$ _____

8. $240 \div 4 =$ _____

9. $810 \div 9 =$ _____

10. $6,400 \div 8 =$ _____

11. $3,500 \div 7 =$ _____

12. $5,000 \div 5 =$ _____

13. $9,000 \div 3 =$ _____

14. $3,000 \div 5 =$ _____



24. **THINK SMARTER** Which quotients are equal to 20? Mark all that apply.

- A $600 \div 2$
- D $140 \div 7$
- B $1,200 \div 6$
- E $500 \div 5$
- C $180 \div 9$



Solve the problems.

a. $27 \div 5 =$ _____

b. $156 \div 4 =$ _____

c. $2,704 \div 3 =$ _____

d. $583 \div 6 =$ _____



Divide. Use partial quotients.

4. $9 \overline{)198}$

5. $7 \overline{)259}$

6. $8 \overline{)864}$

7. $6 \overline{)738}$





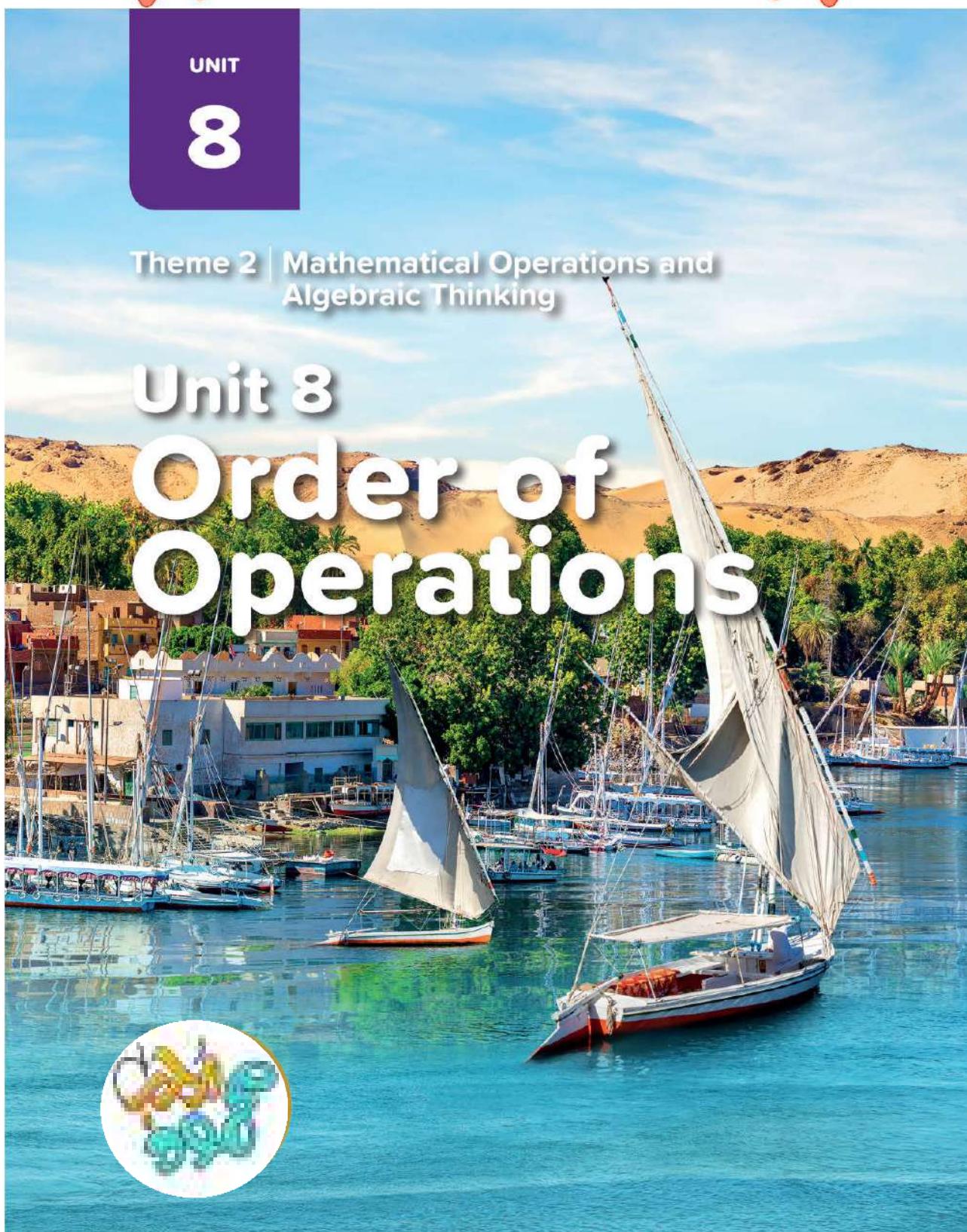
UNIT

8

Theme 2 | Mathematical Operations and
Algebraic Thinking

Unit 8

Order of Operations



Order of Operations

Parentheses

Multiplication and Division (left-to-right)

Addition and Subtraction (left-to-right)

G E M S

Groupings

() { } []

Exponents

n^2

Multiply/Divide

\div / \times

Subtract/Add

$+-$



$$4 + 10 \div 2$$

$$4 + 5$$

$$4 + 5$$

$$9$$

12 - 8 \div 4 + 25 \times 3

12 - 2 + 75





1.

$$\square + \square + \square = 12$$

$$\square + \square + \triangle = 18$$

$$\odot + \triangle + \triangle = 26$$

$$\triangle + \odot \times \square = \underline{\hspace{2cm}}$$



2.

$$\odot + \odot + \odot = 18$$

$$\odot + \times + \odot = 23$$

$$\times + \triangle + \triangle = 17$$

$$\triangle \times \odot + \times \times = \underline{\hspace{2cm}}$$



3.

$$\begin{array}{ccc} \text{purple trapezoid} & + & \text{purple trapezoid} & + & \text{purple trapezoid} \\ & & & & = 27 \end{array}$$

$$\begin{array}{ccc} \text{yellow pentagon} & + & \text{purple trapezoid} & \times & \text{yellow pentagon} \\ & & & & = 80 \end{array}$$

$$\begin{array}{ccc} \text{yellow pentagon} & + & \text{yellow pentagon} & \times & \text{purple circle} \\ & & & & = 48 \end{array}$$

$$\begin{array}{ccc} \text{yellow pentagon} & + & \text{purple circle} & \times & \text{purple trapezoid} \\ & & & & = \underline{\hspace{2cm}} \end{array}$$



4.

$$\begin{array}{ccc} \text{two smiley faces} & + & \text{two smiley faces} & + & \text{one smiley face} \\ & & & & = 36 \end{array}$$

$$\begin{array}{ccc} \text{red heart} & + & \text{red heart} & \times & \text{smiley face} \\ & & & & = 28 \end{array}$$

$$\begin{array}{ccc} \text{red heart} & \times & \text{rainbow} & + & \text{red heart} \\ & & & & = 44 \end{array}$$

$$\begin{array}{ccc} \text{two red hearts} & + & \text{rainbow} & \times & \text{smiley face} \\ & & & & = \underline{\hspace{2cm}} \end{array}$$



5.

$$\begin{array}{ccc} \text{sun} & + & \text{sun} & + & \text{sun} & = & 27 \\ & & & & & & \\ & & & & & & \end{array}$$

$$\begin{array}{ccc} \text{sun} & + & \text{sun} & + & \text{rain} & = & 22 \\ & & & & & & \\ & & & & & & \end{array}$$

$$\begin{array}{ccc} \text{rain} & + & \text{rain} & + & \text{cloud} & = & 18 \\ & & & & & & \\ & & & & & & \end{array}$$

$$\begin{array}{ccc} \text{rain} & \times & \text{cloud} & + & \text{sun} & = & \underline{\hspace{2cm}} \\ & & & & & & \\ & & & & & & \end{array}$$



PRACTICE

Follow the standard order of operations to solve.

1. $8 \times 2 + 13 = \underline{\hspace{2cm}}$

2. $5 \times 6 - 12 = \underline{\hspace{2cm}}$

3. $200 - 80 \times 2 = \underline{\hspace{2cm}}$

4. $5 + 8 \div 2 = \underline{\hspace{2cm}}$

5. $20 \div 5 + 5 = \underline{\hspace{2cm}}$



ACCESS

Which Does Not Belong? Solve the problems. Then, think about which problem does not belong in the set. Highlight or circle the problem you think does not belong and explain your thinking.

1. $6 \times 4 - 4 =$ _____

2. $100 - 80 \times 1 =$ _____

3. $60 + 20 - 50 =$ _____

4. $2,356 - 2,336 =$ _____



PRACTICE

Solve the problems. Show your work.

1. $18 \times 2 + 8 - 3 =$ _____

2. $73 - 60 + 15 \div 3 =$ _____

3. $4 + 4 + 5 \times 10 =$ _____

4. $80 \div 8 - 7 =$ _____



	+		+		=	24
	+				=	12
	+		+		=	12
	+		÷		=



Homework

$$\text{Airplane} + \text{Airplane} + \text{Airplane} = 27$$

$$\text{Keyboard} + \text{Keyboard} = 10$$

$$\text{Calculator} + \text{Calculator} = 6$$

$$\text{Airplane} + \text{Keyboard} + \text{Calculator} = \dots$$



$$\text{Cup} + \text{Cup} + \text{Cup} = 30$$

$$\text{Airplane} + \text{Airplane} = 14$$

$$\text{Mobile Phone} + \text{Mobile Phone} + \text{Mobile Phone} = 9$$

$$\text{Cup} + \text{Airplane} - \text{Mobile Phone} = \dots$$



	+		+		=	15
	+				=	8
	+				=	6
	+		+		=



	+		+		=	21
	+				=	6
	+		+		=	9
	+		×		=



	+		+		=	30
	+				=	18
	+		+		=	15
	+		+		=



$3 + 2 \times 2 - 1 = \dots$

$3 + 6 \div 3 - 3 = \dots$

$5 + 2 \times 3 - 1 = \dots$

$(2 + 8) \div 2 - 3 = \dots$

$7 + 3 \times 3 - 6 = \dots$

$2 + 8 \div 2 - 3 = \dots$

$(2 + 2) \times 3 - 5 = \dots$

$3 + 8 \div 4 - 3 = \dots$

$9 + 2 \times 5 - 9 = \dots$

$(9 + 7) \div 4 - 3 = \dots$

